FLORA OF TROPICAL AFRICA.

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OF

TROPICAL AFRICA.

EDITED BY

SIR W. T. THISELTON-DYER, K.C.M.G., C.I.E.,

LL.D., F.R.S., ETC.

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VOL. VIII.

PONTEDERIACEÆ TO CYPERACEÆ.

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PREFACE.

For the present volume of the "Flora of Tropical Africa" I have been fortunate in securing the assistance of several contributors who had made a special study of the orders they have elaborated.

It has been found impossible to include in it the *Gramineæ*, which will have to be deferred to the ninth and concluding volume.

For the amended definition of the regions into which the area of the flora is divided, reference may be made to the preface to the seventh volume.

In the prefaces to the first, fifth, and seventh volumes will be found an enumeration of the materials employed up to 1868, and of the most important additions to them which have reached Kew since.

The only further collections at Kew cited in the present volume are

I. Upper Guinea:

T. N. Brown	. . .	Collection from the Gold Coast.
J. H. Holland	. . .	,, ,, Nigeria
W. H. Johnson	. . .	,, ,, the Gold Coast.
C. Punch	. . . .	,, ,, Lagos.

VI. Mozambique:

Honourable Mrs. Evelyn Cecil	.	Collection from Rhodesia.
Mrs. E. J. Lugard	. . .	,, ,, Ngamiland.

It is intended to proceed at once with the printing of the fourth volume. This will contain the *Apocynaceæ*, the final elaboration of which has been delayed till the present in order to enumerate and

describe as comprehensively as possible the important caoutchouc-containing and medicinal plants which the order includes in Tropical Africa.

I must again record my acknowledgments of the assistance given me by Mr. C. H. Wright in preparing the manuscript for the press and in checking the proofs, and to Mr. N. E. Brown for working out the geographical distribution.

For the detailed topography the third edition of the "Spezial-Karte von Afrika," Gotha: Julius Perthes, 1893, has been chiefly used.

W. T. T.-D.

KEW, *February* 1902.

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CONSPECTUS OF THE ORDERS CONTAINED IN THE EIGHTH VOLUME.

Series III. Coronarieæ (continued).—*Perianth, or at least the inner series, petaloid. Ovary superior, very rarely slightly immersed at the base. Albumen copious.*

CXLI. PONTEDERIACEÆ. Flowers regular or often slightly irregular. Perianth petaloid; segments biseriate. Stamens 6 or 3, rarely 1. Ovary 3- or 1-celled, many-, rarely 1-ovuled. Embryo straight, central, about as long as the floury albumen. Aquatic herbs.

CXLII. XYRIDEÆ. Flowers regular or slightly irregular, solitary and sessile within the bracts of a terminal head. Perianth biseriate; outer segments 3, 2 or 0, glumaceous; inner segments 3, petaloid, united below into a tube. Stamens 3. Ovary 1- or imperfectly 3-celled; ovules numerous, orthotropous. Embryo small, at the apex of the floury or slightly fleshy albumen. Herbs. Leaves radical.

CXLIIA. MAYACEÆ. Flowers regular, solitary and pedicellate within the thin bracts of a terminal head. Perianth biseriate; outer herbaceous; inner petaloid. Stamens 3. Ovary 1-celled; ovules numerous, orthotropous. Embryo small at the apex of floury or slightly fleshy albumen. Herbs. Stem prostrate or floating, leafy.

CXLIII. COMMELINACEÆ. Flowers regular or slightly irregular. Perianth biseriate; outer herbaceous; inner petaloid. Stamens 6 or by abortion fewer. Ovary 3- or 2-celled; ovules solitary or few, orthotropous. Seed solitary or few and closely packed, attached by a hilum on the inner, with an embryostega on the outer side. Embryo beneath the embryostega, at the edge of or slightly intruded into the floury albumen. Terrestrial herbs.

CXLIV. RAPATEACEÆ. Flowers regular. Perianth-segments 6, all petaloid and connate into a long slender tube, or biseriate, the outer paleaceous and connate or free, the inner petaloid and connate below. Stamens 6; anthers dehiscing by apical pores. Ovary 3-celled; ovules solitary or few, erect, anatropous. Embryo lenticular, outside the albumen near the hilum. Perennial herbs.

Series iv. Calycinæ.—*Perianth calyx-like, small, rigid or herbaceous, the inner rarely petaloid but small. Ovary superior. Albumen copious.*

CXLV. Flagellarieæ. Flowers regular or subregular. Perianth subpetaloid or scarious. Stamens 6. Ovary 3-celled; ovules solitary. Fruit succulent or drupaceous. Embryo lenticular, outside the floury albumen. Robust herbs.

CXLVI. Juncaceæ. Flowers regular. Perianth glumaceous. Stamens 6, rarely 3. Ovary 1–3-celled; ovules solitary or more. Capsule 3-valved. Embryo enclosed in the more or less fleshy albumen. Perennial herbs, rarely shrubs.

CXLVII. Palmæ. Flowers regular or subregular. Perianth coriaceous, fleshy or membranous. Stamens 6 or more. Ovary 1- to many- (usually 3-) celled, sometimes of 3 distinct carpels; ovules solitary. Fruit baccate or drupaceous; 1- or more celled. Embryo small, enclosed in a pit near the margin of the albumen. Trees or shrubs with pinnatisect or flabellate leaves.

Series v. Nudiflorae.—*Perianth none or reduced to scales or setæ. Ovary superior; carpels solitary or if many syncarpous, 1- to many-ovuled. Seeds usually albuminous.*

* Flowers arranged on spadices. Trees, shrubs, or terrestrial herbs.

CXLVIII. Pandaneæ. Flowers diœcious. Perianth none or rudimentary Carpels 1-celled, solitary or more frequently collected into phalanges. Shrubs or trees, erect or climbing. Leaves sessile, long ensiform, sheathing at the base, usually spiny on the margins and underside of the midrib. Spadices fascicled or paniculate; bracts spathaceous.

CXLIX. Typhaceæ. Flowers monœcious, very rarely diœcious. Perianth of 3–6 membranous scales, or absent. Aquatic or marsh herbs with a creeping rhizome. Leaves linear, entire, sheathing at the base. Spadices naked or with 1 leaf-like bract at the base.

CL. Aroideæ. Flowers hermaphrodite or monœcious, very rarely diœcious. Perianth none, or of 3–9 free or connate membranous segments. Herbs or shrubs of various habit. Leaves various. Spadices solitary; spathes convolute, tubular or open at the base.

** Flowers solitary or in pairs in marginal cavities. Minute lenticular or globose floating herbs.

CLI. Lemnaceæ. Flowers very minute, enclosed in a membranous spathe (perianth ?). Stamens 1–2. Ovary 1-celled.

Series vi. Apocarpæ.—*Perianth* 1–2-*seriate or none. Ovary superior; carpels solitary, or if several distinct. Seeds exalbuminous.*

CLII. Alismaceæ. Flowers hermaphrodite, monœcious or polygamous, very rarely diœcious. Perianth regular; segments 6, imbricate, biseriate, rarely uniseriate

by abortion, outer usually herbaceous, inner petaloid. Embryo horseshoe-shaped. Aquatic or marsh herbs. Leaves usually radical.

CLIII. NAIADACEÆ. Flowers monœcious, diœcious, or hermaphrodite. Perianth regular, membranous, or absent; segments 2–4, valvate. Embryo curved or straight, thick at the radicular end. Aquatic herbs of various habit.

Series vii. Glumaceæ.—*Flowers sessile, solitary within imbricate bracts or glumes arranged in heads or spikelets. Perianth-segments small, scale-like, glumaceous or none. Ovary* 1*-ovuled or divided into* 1*-ovuled cells. Seeds albuminous. Herbs, except Bambuseæ.*

CLIV. ERIOCAULEÆ. Flowers unisexual, densely crowded into monœcious involucrate heads. Perianth-segments 4 or 6, biseriate, small, hyaline, the inner often on a distinct stipes, scarious or membranous. Ovary 3–2-celled; ovules pendulous. Embryo small, outside the albumen remote from the hilum.

CLV. RESTIACEÆ. Flowers most frequently diœcious, in spikelets; bracts usually dry or rigid. Perianth-segments 6, regular, biseriate, glumaceous or the inner membranous. Ovary 1–3-celled; ovules solitary, pendulous. Embryo small, outside the albumen remote from the hilum.

CLVI. CYPERACEÆ. Flowers uni- or bi-sexual, in spikelets; glumes imbricate. Perianth of 6 or fewer small scales or bristles, or absent. Ovary 1-celled; ovule erect. Fruit a nut. Seed free from the pericarp; embryo small, within the base of the albumen.

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13

FLORA OF TROPICAL AFRICA.

Order CXLI. **PONTEDERIACEÆ.** (By N. E. Brown.)

Flowers hermaphrodite, all alike or some cleistogamous, regular or slightly irregular. Perianth inferior, petaloid; segments 6, biseriate, united into a tube in the lower part, rarely free, equal or the outer series smaller. Stamens 3 or 6, rarely 1, usually of two sizes and often of different colours; filaments free; anthers basifixed or dorsifixed, 2-celled, introrse, opening by longitudinal slits or rarely by terminal pores. Ovary superior, 3-celled with axile placentas, or 1-celled with 3 parietal or more or less prominent placentas; style filiform; stigma entire, thickened or subcapitate or shortly 3-lobed; ovules numerous and biseriate in each cell or rarely solitary, anatropous. Fruit a many-seeded capsule or rarely a 1-seeded achene. Seeds small, ovoid, ribbed; embryo cylindrical, straight, embedded in the centre of a copious albumen.—Aquatic or marsh herbs, with the lower part of the stem or rhizome often creeping and rooting in the mud, or entirely floating. Leaves alternate, hastate, cordate, orbicular, ovate, lanceolate or linear, entire, with a sheathing petiole or stipulate, the submersed leaves sometimes without blades, or different in form. Inflorescence terminal—often apparently arising from the petioles of the leaves, the lower part of such leaf-stalks being really sympodial branches—either fascicled in the sheath of the flowering leaf, or spicate with the flowers solitary or fascicled along the axis of the spike, or rarely with a solitary and axillary flower.

A small order of about 25 species, chiefly natives of Tropical Africa and Tropical America, about 4 occurring in North America, 2 or 3 in Tropical and Temperate Asia, 1 in South Africa, and 1 in Australia.

Stamens 3 in the expanded flowers . . . . . 1. Hetranthera.
Stamens 6 in the expanded flowers:
  Perianth segments united into a tube below . . 2. Eichornia.
  Perianth segments free to the base . . . . 3. Monochoria.

Excluded.

Schœnlandia gabonensis, *Cornu in Bull. Soc. Bot. France*, 1896, xliii. 21, is **Cyanastrum cordifolium**, *Oliv.* in Hæmodoraceæ.

1. **HETERANTHERA,** Ruiz et Pav.; Benth et Hook. f. Gen. Pl. iii. 838.

Perianth with a distinct tube; segments equal, spreading, oblong. Stamens 3 or in the closed flowers of some species 1, affixed to the throat of the perianth-tube, exserted, more or less unequal; filaments filiform; anthers oblong. Ovary 1-celled with 3 parietal placentas, or imperfectly 3-celled with very prominent placentas; style filiform; stigma thickened; ovules numerous, biseriate. Capsule oblong or linear; pericarp thin. Seeds numerous, ovoid, ribbed.—Aquatic herbs, with the lower part of the stem creeping and rooting in the mud. Leaves with long petioles sheathing at the base, and cordate, ovate, or reniform blades, or all linear and submersed. Flowering shoots bearing one leaf, whose sheath embraces the membranous spathe, which subtends the terminal flower-spike or includes 1–3 flowers. Flowers spicate, small, blue, whitish or yellow, all alike and expanding, or one or more cleistogamous and enclosed in the sheath of the leaf at the base of the spike.

A genus of about 9 species, 3 in Africa, the rest in Tropical and North America.

The plant collected in Angola by Welwitsch (3015), and enumerated by Rendle in Cat. Afr. Pl. Welw. ii. 67 as *Heteranthera sp.*, does not belong to the order PONTEDERIACEÆ, but to ALISMACEÆ, and may be a species of *Alisma* or *Sagittaria*. There are no perfect flowers upon the specimens; the buds which I have dissected consisting of a series of imbricating, complicate, boat-shaped segments, arranged distichously.

Spike with one closed flower, concealed in the spathe at its base.	
Perianth-tube 3–5 lin. long; closed flower with 3 stamens	1. *H. callæfolia.*
Perianth-tube $2\frac{1}{2}$–3 lin. long; closed flower with 1 stamen	2. *H. kotschyana.*
Spike with more than one closed flower, some being mingled with the expanded flowers	3. *H. Potamogeton.*

1. **H. callæfolia,** *Reichb. ex Kunth, Enum.* iv. 121 (*by error* 123). Plant about a foot high, herbaceous, glabrous. Stem creeping and rooting in the mud in the lower part. Leaves 2–3 in. long, $1\frac{1}{2}$–2 in. broad, ovate, subobtuse, or shortly and obtusely pointed, cordate at the base, with petioles 4–8 in. long, erect or ascending. Flowering stems about 2 in. long. Flower-spike about 4 in. long, with a submembranous spathe at its base. Flowers several, sessile, ebracteate, whitish; the basal flower concealed in the spathe within the sheath of the leaf, never expanding, having 3 stamens like the others. Perianth-tube of the expanded flowers 3–5 lin. long, cylindric; lobes about $2\frac{1}{2}$ lin. long, oblong, obtuse, spreading. Stamens 3, shortly exserted. Ovary oblong, trigonous, narrowed into a filiform style as long as the stamens; stigma slightly thickened. Capsule of the basal closed flower 6–9 lin. long, of the other flowers 4–5 lin. long, oblong, trigonous.—Solms in DC.

Monogr. Phan. iv. 521; Engl. Pfl. Ost-Afr. C. 137; Durand & Schinz, Consp. Fl. Afr. v. 419.

Upper Guinea. Senegal, *Sieber*, 51; *Perrottet*, 781. Senegambia, *Heudelot*, 230!

I have been unable to examine a closed flower of this species, and give the number of its stamens on the authority of Count Solms.

2. **H. kotschyana,** *Fenzl ex Solms in Schweinf. Beitr. Fl. Aethiop.* 205. Plant 5–12 in. high, herbaceous, glabrous, with the lower part of the stem creeping, and rooting at the nodes. Leaves 1–2¾ in. long, ½–1¾ in. broad, cordate, obtusely pointed, with petioles 2½–8 in. long, erect or ascending. Flowering stems 1½–4 in. long. Flower-spike 2–4 in. long, with a submembranous spathe at its base. Flowers several, sessile, ebracteate; the basal flower concealed in the spathe within the sheath of the leaf, never expanding, having but 1 stamen. Perianth-tube of the expanded flowers 2½–3 in. long, cylindric, very slightly curved and a little oblique at the mouth; lobes 2 lin. long, ¾ lin. broad, oblong, obtuse, spreading. Stamens 3, shortly exserted. Ovary oblong, trigonous; style filiform, as long as the stamens, with a simple slightly thickened stigma. Capsule of the basal closed flower 8–9 lin. long, of the other flowers 4–6 lin. long, oblong, trigonous.—Solms in DC. Monogr. Phan. iv. 522; Engl. Pfl. Ost-Afr. C. 137; Durand & Schinz, Consp. Fl. Afr. v. 419. *Monochoria vaginalis*, Kirk in Journ. Linn. Soc. viii. 147; Rendle in Cat. Afr. Pl. Welw. ii. 67, not of Presl. *M. sp.*, Thomson in Speke, Nile, Append. 649.

Nile Land. Cordofan: between Melbes and Obeid, *Cienkowsky*, 378 (ex Solms); Arashkol Mountain, *Kotschy*, 9! British East Africa: Bongo: Gurfala, *Schweinfurth*, 2239! Madi, *Speke & Grant*, 655!

Lower Guinea. Angola: Pungo Andongo; in ponds near Banza de Quitage, *Welwitsch*, 3013!

Mozamb. Dist. Portuguese East Africa: Nkueza, on the River Zambesi, *Kirk!*

Also in the Transvaal.

This differs from *H. callæfolia*, Reichb. in its shorter perianth-tube, and in the closed flower having only 1 stamen. According to Rendle in Cat. Afr. Pl. Welw. ii., 67, Welwitsch's 3013 is indistinguishable from the type of *Monochoria vaginalis*, Presl, but in my opinion it is without doubt a species of *Heteranthera*, and, I believe, *H. kotschyana*, although I have been unable to examine the cleistogamous flower, as the specimen at Kew is in fruit only. *Monochoria vaginalis* has not yet been collected in Africa.

3. **H. Potamogeton,** *Solms in DC. Monogr. Phan.* iv. 521. Stem elongated, sparingly rooting. Flower-stem bent backwards after flowering. Leaves ovate or elongate-ovate, acuminate, with long petioles. Flower-spike short, bearing a few distant normal and closed flowers intermingled, the basal flower always closed and concealed in the spathe within the sheath of the leaf. Normal or expanding flowers with a gland-dotted perianth and 3 stamens; closed flowers not gland-dotted, and with only 1 stamen; the basal one producing a large cylindric

capsule that is much longer than those of the other flowers on the spike.—Durand & Schinz, Consp. Fl. Afr. v. 419.

Upper Guinea. Senegal; Pozo Cervalo, *Perrottet*, 779.

I have not seen this plant, which is described as having the facies of a *Potamogeton*, and said to differ from *H. callæfolia*, Reichb., and *H. kotschyana*, Fenzl, in having several closed flowers on the spike.

2. EICHORNIA, Kunth; Benth. et Hook. f. Gen. Pl. iii. 838.

Perianth funnel-shaped, with a long or short tube; segments a little unequal, the interior series broadest, and the upper segment of that series usually marked with a spot. Stamens 6, the 3 upper ones included, the 3 lower more or less exserted, usually with longer filaments and inserted higher up the perianth-tube; filaments filiform; anthers dorsifixed, oblong. Ovary sessile, 3-celled; style filiform; stigma slightly dilated or very shortly 3- or 6-lobed; ovules numerous in each cell. Capsule included in the marcescent perianth-tube, ovoid, oblong or linear-fusiform; pericarp membranous. Seeds numerous, ellipsoid or oblong, finely ribbed; embryo cylindric, in the centre of the albumen. —Aquatic herbs, entirely floating, or the lower part of the stem creeping and rooting in the mud. Leaves with long petioles sheathing at the base, and obovate, orbicular, ovate or lanceolate blades, cordate or narrowed at the base, or the submersed leaves linear; sheath of the petiole often much produced at the apex and then described as a stipule. Inflorescence pedunculate, spicate or paniculate, with a convolute sheath-like spathe or rarely an expanded bract at its base, or fasciculate within the sheath of the leaf.

A small genus of 6 species, all (except the following) Tropical American.

1. **E. natans,** *Solms in Abhandl. naturw. Ver. Bremen*, vii. 254. Stems branching, about 1 lin. thick. Submersed leaves 2–4 in. long, 1–1½ lin. long, sessile, linear, acute. Floating leaves petiolate, ½–1 in. long, 5–10 lin. broad, ovate or orbicular, obtuse, or rarely acute, cordate with small rounded overlapping lobes at the base. Stipules varying from 1 lin. long in the submersed leaves to 1¼ in. long on the floating leaves, obtuse, more or less sheathing the stem, membranous, reticulate with dark purple cross-veins. Flowers apparently arising from below the middle of the petioles of the floating leaves, but in reality terminating short lateral 1-leaved branches of the main stem, shortly pedunculate, solitary in a tubular membranous obtuse spathe ½ in. long. Perianth-tube 5–6 lin. long at the expansion of the flower, rapidly elongating afterwards to 10–11 lin. long; limb small, 6-lobed, blue, about ¼ in. diam. Capsule 5–6 lin. long, narrowly fusiform. Seeds numerous, oblong, with numerous exceedingly fine longitudinal ribs.—Solms in DC. Monogr. Phan. iv. 526; Engl. Pfl. Ost-Afr. C. 137; Durand & Schinz, Consp. Fl. Afr. v. 418. *Pontederia natans*, Beauv. Fl. Oware, ii. 18, t. 68, fig. 2; Poir. Encycl. Suppl. iv. 526. Roem. & Schultes,

Syst. Veg. vii. pt. 2, 1147; Kunth, Enum. iv. 128. *Monochoria natans*, Thomson in Speke, Nile, Append. 649.

Upper Guinea. Senegal, *Perrottet, Leprieur*, and *Heudelot*, 258 (ex *Solms*). Sierra Leone; in a pool on the way to Danlilia and near Falaba, *Scott-Elliot*, 5290! Niger Territory: Nupe, *Barter!* Oware: banks of the River Formosa, *Palisot de Beauvois* (ex *Solms*).

Nile Land. British East Africa: Madi, *Speke & Grant*, 726! 727! Gazelle River, *Schweinfurth*, 1166! 1208! Jur: between Gir and Addai, *Schweinfurth*, 2555!

Also occurs in Madagascar according to Count Solms.

The plant collected in Loanda, Angola, by Welwitsch (3014), and referred by Rendle in Cat. Afr. Pl. Welw. ii., 66 to *Eichornia natans*, is certainly not that species, but appears to be a seedling, without flowers or fruit, of some Dicotyledon. The specimen is but a worthless scrap.

3. **MONOCHORIA**, Presl; Benth. et Hook. f. Gen. Pl. iii. 839.

Perianth-segments 6, free to the base, subequal, oblong. Stamens 6, affixed to the base of the perianth-segments, equal or unequal, especially as to the anthers, the largest stamen with an erect tooth on one side of the filament; anthers oblong, erect, basifixed, opening by longitudinal slits. Ovary sessile, 3-celled, with axile placentas; style filiform, very shortly trifid or somewhat 6-fid at the apex; ovules numerous in each cell.—Aquatic herbs. Rhizome stout and creeping, or none. Leaves all radical, or rarely spaced out on a short erect stem, alternate, with long sheathing petioles, and sagittate, cordate-ovate or lanceolate blades. Flowering stems radical, with one sheathing leaf or a tubular sheath at its summit, enclosing the membranous spathe at the base of the peduncle. Flowers racemose, of moderate size, blue, all alike.

A genus of about 5 species, natives of the warmer parts of the Old World. The following is the only African species.

1. **M. africana,** *N. E. Br.* Plant 1½–2 ft. high, glabrous. Rhizome none. Leaves and flower-stems all radical, with a dense tuft of fibrous roots at their base. Leaves 3–4½ in. long, 2–3 in. broad, ovate, acuminate, slightly cordate at the base, with long petioles. Flowering stems 11–14 in. long, stout, with a leaf or a tubular leaf-sheath at their summit, enclosing a membranous spathe or bract 8–9 lin. long, which is abruptly terminated by a filiform point 2–4 lin. long. Peduncle 1½–2½ in. long, rather stout. Flower-spike 2½–4 in. long. Flowers numerous, rather crowded, ebracteate, erect, violet. Pedicels 1½–2 lin. long, erect. Perianth campanulate or somewhat funnel-shaped, 5–6 lin. long; outer segments 1½ lin. broad, oblong, obtuse, with narrow membranous margins; inner segments 3 lin. broad, elliptic, obtuse, with broad membranous margins. Stamens (especially the anthers) unequal; filaments of the largest stamen with an erect tooth on one side. Ovary ovoid, trigonous; style filiform, divided at the apex into 3 short bifid stigmatic lobes.—*M. vaginalis*, Presl, var. *africana*.

Solms in DC. Monogr. Phan. iv. 525; Durand & Schinz, Consp. Fl. Afr. v. 419.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2296!

This plant is perfectly distinct from the Asiatic *M. vaginalis*, Presl, with which it has been associated by Count Solms.

ORDER CXLII. **XYRIDEÆ.** (By N. E. Brown.)

Flowers hermaphrodite. Calyx inferior, irregular; sepals 3 or rarely 2, the two lateral exterior, boat-shaped, keeled, glumaceous, the third interior, membranous, convolute, forming a closed obtuse spathe-like hood, or obtusely calyptriform, circumscissile at the base and split open on one side, closely enveloping the corolla when in bud and pushed off as the corolla grows out and expands, rarely absent. Corolla regular, petaloid, marcescent; tube slender, usually split into claw-like segments at the base by the growth of the ovary; lobes 3, cuneate-obovate, spreading. Stamens 3, affixed at the mouth of the corolla-tube opposite the lobes; filaments short, flattened; anthers basifixed, oblong, 2-celled, cells parallel or slightly divergent at the base, contiguous, or more or less separated by a broad connective, extrorse, opening by longitudinal slits. Staminodia 3 or 0, alternating with the corolla-lobes at the mouth of the tube, simple and entire or bifid at the apex, or divided into two entire or bifid arms, glabrous or hairy, or ending in dense or lax brush-like tufts of hairs, and then very short. Ovary superior, 1-celled or imperfectly 3-celled; placentas 3, parietal or shortly united at the centre, or free and erect from the base; ovules indefinite, 2-seriate, orthotropous; style filiform, sometimes with tubercles or processes at or below the middle, trifid or 3-armed at the apex, or entire; stigmas dilated or subcapitate, usually oblique. Capsule dividing into 3 valves between the placentas. Seeds minute, ovoid, apiculate; hilum basilar; testa thin, usually ridged; albumen copious, transparent; embryo minute, broadly depressed-conical, seated at the apex of the albumen under the terminal apiculus.—Perennial or rarely annual herbs of tufted habit, growing in damp or wet situations. Leaves all radical, linear, terete or filiform, sheathing at the base. Peduncles erect, simple, terminated by a solitary dense head or spike, leafless or bearing one or more pairs of convolute sheaths, and embraced at the base by a leafless or leaf-bearing sheath. Flower-heads or spikes globose, ovoid, or elongate; bracts glumaceous, somewhat rigid or thin and papery, spirally imbricate one above another, or the inner all reaching to about the same level, concave, complicate, or rarely somewhat convolute, the lower in a few species elongated and leafy, forming an involucre. Flowers solitary and sessile in the axils of the bracts, yellow, white, or blue, usually of small size.

An order of 2 genera, of which only one is represented in Africa, and about 160 species, dispersed throughout the Tropical and Subtropical regions of the earth.

1. XYRIS, Linn.; Benth. et Hook. f. Gen. Pl. iii. 842.

Sepals 3; two lateral and exterior, boat-shaped, keeled; one interior, membranous, convolute or obtusely calyptriform, closely enveloping the corolla when in the bud, circumscissile at the base and deciduous as the corolla develops. Corolla with a slender tube and 3 spreading cuneate-obovate lobes. Staminodia 3, simple, bifid or 2-armed, glabrous, hairy, or divided into a brush-like tuft of hairs. Style filiform, without tubercles or processes, 3-branched above; stigmas dilated or subcapitate.—Peduncles with a basal sheath, naked above. All other characters as in the Order.

A genus of about 150 species, having the same distribution as the Order.

In the following descriptions, flowering bracts taken from the middle of the spike are those described, unless others are specially mentioned, and their nervation is given as seen by transmitted light when they are placed in water. The shape and breadth of the lateral sepals is given as when seen lying on their side. In most of the species the leaves and peduncles are usually more or less twisted. The ciliation or toothing on the keel of the lateral sepals in some species is very minute, and, unless examined under a lens of considerable power, may easily be overlooked. The dorsal area, mentioned in the descriptions, is an area on the back of the bracts in which the surface is of a different character from the rest of the bract and usually appears somewhat impressed, as if stamped upon it.

Outermost bracts ⅓–6 in. long, unequal, spreading, much longer than the spike and forming a distinct involucre . . . 1. *X. foliolata.*

Outermost bracts shorter or nearly equalling the spike, adpressed, not forming a spreading involucre.

Bracts (or at least 2 or 3 of the outermost) with a stout awn at the apex; plants 1–3 ft. high.

Bracts dull dark brown, with broad white lacerate and ciliate membranous margins . . . . 2. *X. aristata.*

Bracts blackish or dark brown, shining, without membranous margins.

Inner bracts ciliate at the apex; lateral sepals very distinctly and evenly ciliate all along the keel from the base to the apex . . . . . 3. *X. rigidescens.*

Inner bracts not ciliate at the apex; lateral sepals minutely ciliate along the middle part of the keel or occasionally to the apex, but not on the basal third . . . . . 4. *X. dispar.*

Bracts all without awns, but sometimes shortly mucronate (see also *X. dispar*, in which most of the bracts are without awns).

*Bracts (or at least the inner), minutely ciliolate at the apex, very obtuse.

Keel of lateral sepals very narrowly winged, not ciliate . . . . . 22. *X. angustifolia.*

Keel of lateral sepals ciliate; bracts chestnut-brown.

Spike 2½ lin. thick; bracts with a distinct greyish dorsal area . . . . 29. *X. congensis.*

Spike 3–3½ lin. thick; bracts shining brown, with an obscure dorsal area on some of them . . . . 30. *X. nitida.*

Bracts not ciliolate, entire, lacerate or erosulate.

†Keel of the lateral sepals quite entire, neither ciliate nor scabrid (see also under ††, as the very minute scabridity on the keel of some of the species there placed may be easily overlooked, unless examined under a powerful lens).

Peduncles $\frac{1}{2}$–$1\frac{1}{3}$ lin. broad, flattened, 2-edged; spike globose; bracts coriaceous straw-coloured, with a green keel at the apex . . . . . 5. *X. anceps.*

Peduncles terete or slightly compressed, rarely 2-edged, and then less than $\frac{1}{2}$ lin. thick, striate.

Peduncles stout, 1–$1\frac{1}{3}$ lin. thick; spike globose, dark brown; keel of lateral sepals with a very narrow wing . . . . . 6. *X. zombana.*

Peduncles few, $\frac{1}{2}$–1 lin. thick; rhizome creeping; spike globose or ellipsoid, dark brown; keel of lateral sepals with a moderately broad wing . 7. *X. capensis.*

Peduncles numerous, filiform or very slender, $\frac{1}{6}$–$\frac{1}{2}$ lin. thick; rhizome not creeping.

Leaves subterete or subulate-filiform; spikes $1\frac{1}{2}$–$2\frac{1}{2}$ lin. thick, blackish, shining . . . . . 14. *X. makuensis.*

Leaves linear; spikes small, few-flowered.

Bracts emarginate, slightly recurved at the apex, fuscous with a green keel on the upper part . . . . . 15. *X. humilis.*

Bracts obtuse or subacute, not recurved at the apex.

Keel of the lateral sepals distinctly (but usually narrowly) winged, at least in the basal part.

Bracts subcoriaceous, light brown, the inner rather stoutly keeled on the upper half; lateral sepals broadly lanceolate, acute 16. *X. huillensis.*

Bracts very thin, submembranous, light reddish-brown, with broad transparent straw-coloured margins; lateral sepals somewhat oblong-lanceolate, acute . . . 17. *X. anisophylla.*

Bracts thin, dull purplish, the outer nearly as long as the inner; lateral sepals

oblong or oblong-lanceolate, obtuse . . . 18. *X. fugaciflora.*

Keel of the lanceolate acute lateral sepals obtuse or rounded, not at all winged; leaves sometimes minutely rugulose in the dried state.

Bracts subcoriaceous, dull smoky brown, the inner convolute scarcely keeled at the apex . . . 21. *X. multicaulis.*

Bracts rather thin, straw-coloured or light brown, the inner very distinctly keeled and complicate-acute at the apex . . 19. *X. straminea.*

††Keel of the lateral sepals very minutely ciliate or scabrid, not absolutely entire.

Peduncles 18–24 in. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. thick; spike 2–$2\frac{1}{2}$ lin. thick, brown; bracts coriaceous, the inner with a stout dark green keel . . . . . 27. *X. Barteri.*

Peduncles under 16 in. long, very slender, $\frac{1}{4}$–$\frac{1}{2}$ lin. thick.

Outer bracts with a distinct linear greyish dorsal area; keel of the sepals minutely scabrid on the apical part only . . . . 24. *X. filiformis.*

Bracts all without a dorsal area.

Keel of the lateral sepals minutely scabrid to or at the apex only.

Leaves forming a bulbous base to the plant; peduncle subquadrangular; keel of the lateral sepals crimson in the apical part 23. *X. erubescens.*

Leaves distichous, not forming a bulbous base; peduncle terete; keel of the lateral sepals golden-brown . . . 20. *X. pumila.*

Keel of the lateral sepals very minutely ciliate or scabrid to $\frac{1}{2}$ or $\frac{3}{4}$ the way up, chiefly in the middle part, entire in the apical part.

Leaves filiform; lateral sepals $1\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin. broad, sigmoid-lanceolate; corolla white 8. *X. nivea.*

Leaves linear.

Peduncles with longitudinal minutely scabrid ridges; spike $2\frac{1}{2}$–$4\frac{1}{2}$ lin. thick, several-flowered, light brown or dirty ochreous . 9. *X. Welwitschii.*

Peduncles without scabrid ridges; spikes small, few-flowered.

Lateral sepals $\frac{1}{2}-\frac{2}{3}$ lin. broad, broadly lanceolate, acute; keel regularly much curved from base to apex, with a very narrow wing below . 10. *X. scabridula.*

Lateral sepals $\frac{1}{3}$ lin. broad, linear-lanceolate, very acute; keel slightly curved at the middle, erect at the apex, narrowly winged . . 11. *X. humpatensis.*

Lateral sepals $\frac{1}{3}-\frac{1}{2}$ lin. broad, oblanceolate, obtuse; keel nearly straight in the lower $\frac{2}{3}$, rather broadly winged . . 12. *X. affinis.*

†††Keel of the lateral sepals distinctly and rather coarsely serrulate; bracts with a very distinct greyish dorsal area.

Peduncle $\frac{1}{3}-\frac{1}{2}$ lin. thick, acutely 4–6-angled; spike $2\frac{1}{2}$–3 lin. thick . . 25. *X. angularis.*

Peduncle stout, 1–$1\frac{1}{3}$ lin. thick, terete, many-striate; spike 5–6 lin. thick . 26. *X. decipiens.*

††††Keel of the lateral sepals very distinctly and usually rather densely ciliate to the apex.

Spikes not more than 5–6-flowered; flowering bracts all reaching to nearly the same level; peduncles not more than $\frac{1}{2}$ lin. thick, slightly compressed . . 13. *X. obscura.*

Spikes 10–30-flowered; flowering bracts imbricated one above another.

Peduncles distinctly compressed; spikes blackish-brown, scarcely shining; bracts $2\frac{1}{2}-2\frac{3}{4}$ lin. long, without a dorsal area . . . . 31. *X. Hildebrandtii.*

Peduncles terete or subterete, very smooth and shining; spikes chestnut-brown; bracts $1\frac{3}{4}-2\frac{1}{4}$ lin. long, with an indistinct dorsal area . 28. *X. batokana.*

1. **X. foliolata,** *Nilss. in Svensk. Vet. Akad. Handl.* xxiv. *No.* 14, 65. Peduncle about 2 ft. long, "teretely triquetrous," glabrous. Peduncular-sheath green, with a subterete leafy point $1\frac{1}{3}$ in. long. Spike $4\frac{1}{2}$ lin. long, 3 lin. thick, ovate, involucrate; lowest involucral bract about 5 lin. below the spike, 6 in. long, subterete, sheathing at the base, the 3 other involucral bracts reduced to flat spreading sheaths, decreasing in size from $1\frac{1}{2}$ to $\frac{1}{3}$ in. long, about $1\frac{1}{2}$ lin. broad. Flowering bracts $2\frac{1}{2}$ lin. long, $1\frac{3}{4}$ lin. broad, broadly obovate, obtuse, very shortly apiculate, coriaceous, cucullate, entire, bright fuscous, lighter towards the margins, slightly shining, with a triangular area on the back. Lateral sepals 2 lin. long, oblong, keeled; keel narrowly winged, ciliate.

Corolla-lobes yellow, toothed at the apex. Arms of the staminodes very short, ending in a brush-like tuft of long yellow hairs. Anthers linear.—Durand & Schinz, Consp. Fl. Afr. v. 420.

Lower Guinea. Angola: Malange, *Mechow* in *Zurich Herb.*

I have not seen this plant, but, according to the description, it differs from all the other African species in its involucrate spikes. The leaves are undescribed, the specimen being imperfect.

2. **X. aristata,** *N. E. Br.* Leaves 7½–12 in. or more long, 1–2½ lin. broad, linear, acute, shortly awned in the young state, rather rigid, conspicuously striate, glabrous, green, with concolorous sheaths 3–3½ in. long. Peduncular-sheath 8–9 in. long, keeled in the upper part, with an acute flat point 1–3½ lin. long, glabrous, green, passing into pale reddish-brown at the base. Peduncle 2–3 ft. high, 1–1½ lin. thick, more or less compressed and slightly 2-edged in the upper part, very minutely transversely rugulose, not striate; pith loose, not hollow at the centre. Spikes 5–6 lin. long, 4–5 lin. thick, somewhat obovoid, about 10–12-flowered. Outer barren bracts nearly as long as the spike, similar to the flowering bracts, all about 4–4½ lin. long, exclusive of the 1–2 lin. long awn, 3 lin. broad, elliptic-oblong, obtuse, with a terminal awn, concave or hooded, dark chestnut brown with very broad white membranous margins, lacerate and ciliate; nerves indistinct, reticulated at their apex. Lateral sepals 3½–3¾ lin. long, excluding the ¾ lin. long awn, rather more than 1 lin. broad, oblong or somewhat elliptic-oblong, acute, awned, keeled, dark-brown along the keel, pale horn-colour on the membranous sides; keel narrowly winged, ciliate from the base nearly to the apex. Corolla yellow; petals 2 lin. long, 1⅓–1¾ lin. broad, cuneate-obovate, minutely crenulate-denticulate. Arms of the staminodes about ⅔ lin. long, slender, covered with long yellow hairs. Anthers oblong.

Mozamb. Dist. British Central Africa: Kambole, south-west of Lake Tanganyika, 5000 ft., *Nutt!*

A very distinct species, differing from every other *Xyris* known to me in its aristate bracts with broad white membranous ciliate margins.

3. **X. rigidescens,** *Welw. ex Rendle in Cat. Afr. Pl. Welw.* ii. 67. A tall plant of robust habit. Leaves 7–10 in. long, 1–1⅔ lin. broad, linear, tapering rapidly above to a shortly pungent apex, rigid, glabrous. Peduncular-sheath 3–6 in. long, leafless, ending abruptly in a sharp stiff apiculus, glabrous, reddish-brown to the middle. Peduncle 1–2½ ft. long, compressed. Spike 4–6 lin. long and thick, subglobose. Outer bracts very coriaceous 2–2½ lin. long, 2 lin. broad, orbicular, concave, keeled below the abruptly aristate apex, blackish, shining; inner bracts slightly shorter than the calyx, 2½ lin. long, ovate, acuminate to a hardened mucronate (not aristate) apex, boat-shaped, keeled, entire, ciliate at the apex, golden-brown, with thinner and paler margins, darker at the apex, with a narrowly lanceolate greenish dorsal area. Lateral sepals 3–3¼ lin. long, ⅔ lin. broad, linear-oblong, subulate-apiculate, golden-brown along the back, passing into light straw-

colour on the sides; keel shortly ciliate from the base up to the base of the apiculus. Corolla-lobes (withered) apparently oblong. Arms of the staminodes with brush-like tufts of long brownish hairs, shorter than the stamens. Anthers broadly linear.

Lower Guinea. Angola: Huilla; plentiful in spongy places, near streams, around Lopollo, *Welwitsch*, 2474!

4. **X. dispar,** *N. E. Br.* Leaves not seen. Peduncular-sheath about 6 in. long, with a leafy linear point about $\frac{1}{2}$ in. long, $\frac{1}{3}$ lin. broad, glabrous. Peduncle about 2 ft. long, $\frac{3}{4}$ lin. broad, much compressed, glabrous. Spike 3–$3\frac{1}{2}$ lin. long, and about the same in thickness, subglobose. Outer bracts about 2 lin. long, $1\frac{1}{2}$–2 lin. broad, coriaceous, elliptic or suborbicular, obtuse, entire, not ciliate, 2 or 3 of them terminated by a short awn $\frac{1}{2}$–1 lin. long, the others apiculate and slightly keeled at the apex, dark brown, shining; inner bracts all reaching to about the same level, $2\frac{3}{4}$–3 lin. long, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. broad, coriaceous, with thin margins, ovate, shortly acuminate into a rigid very acute almost pungent point, keeled, concave, entire, not ciliate, light olive-brown, with a slight yellowish tinge. Lateral sepals $2\frac{1}{2}$–3 lin. long, $\frac{3}{4}$ to nearly 1 lin. broad, somewhat oblong-lanceolate, regularly curved along the back, nearly straight along the margins, somewhat obtuse, mucronate, golden-brown along the back, darker at the apex, the colour fading out and disappearing at the broad membranous margins; keel very narrowly winged, minutely ciliate or scabrid along the middle part or occasionally nearly or quite up to the base of the short subulate mucro, but not on the basal third. Corolla-lobes 3 lin. long, $1\frac{3}{4}$ lin. broad, cuneate-obovate, subtruncate and rather coarsely toothed at the apex, bright yellow. Arms of the staminodes short, linear, with brush-like tufts of long yellow hairs half as long as the petals. Anthers $1\frac{1}{4}$ lin. long, linear-oblong.

Mozamb. Dist. British Central Africa: Mashonaland; at Six-mile Spruit, near Salisbury, *Hon. Mrs. Evelyn Cecil*, 152!

5. **X. anceps,** *Lam. Encycl.* i. 132. Leaves 2–14 in. long. $1\frac{1}{4}$–$4\frac{1}{2}$ lin. broad, linear, obtuse or acute, glabrous, with concolorous sheaths $\frac{3}{4}$–$4\frac{1}{2}$ in. long. Peduncular-sheath $1\frac{1}{2}$–$6\frac{1}{2}$ in. long, leafless and obtuse or with a leafy obtuse point $\frac{1}{4}$–$\frac{1}{2}$ in. long. Peduncle $\frac{1}{2}$–$2\frac{1}{2}$ ft. long, $\frac{1}{2}$–$1\frac{1}{3}$ lin. broad, compressed and acutely two-edged, especially towards the apex, glabrous. Spike globose or broadly ovoid, 3–5 lin. diam., many-flowered. Bracts 2–3 lin. long, $1\frac{3}{4}$–2 lin. broad, coriaceous, elliptic, very obtuse, or the inner ones subacute, entire, not ciliate, light yellowish-brown or pale straw-coloured, with a narrowly ovate or lanceolate acute green area at the slightly keeled apex; nerves about 7–9, very slender and obscure. Lateral sepals $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long, $\frac{1}{2}$ lin. broad, subspathulate-lanceolate, straight or slightly falcate, acute, with a rather broad wing-like keel, neither ciliate nor produced at the apex, entirely pale straw-colour. Corolla yellow; tube $2\frac{1}{2}$ lin. long; lobes about $1\frac{1}{2}$ lin. long, $\frac{3}{4}$–1 lin. broad, broadly cuneate-obovate, denticulate. Arms of the staminodes very small, with a brush-like tuft of long yellow hairs. Anthers oblong. Capsule $1\frac{1}{2}$ lin. long, trigonous, oblong, obtuse, not apiculate.—Nilss. in Svensk. Vet. Akad. Handl. xxiv. no. 14, 37; Durand & Schinz, Consp. Fl. Afr. v. 419; Engl.

Pfl. Ost-Afr. C. 133; N. E. Br. in Dyer, Fl. Cap. vii. 6. *X. platycaulis*, Poir. Encycl. viii. 820; Roem. & Schultes, Syst. Veg. i. 551; Kunth, Enum. iv. 18; Nilss. in Öfvers. Vet. Akad. Förhandl. Stockh. 1891, 153. *X. nitida*, Willd. ex Dietr. Sp. Pl. ii. 372, not of Nilsson.

Upper Guinea. Sierra Leone: Mahela, in marshy ground, *Scott-Elliot*, 3931! Lagos, *Millen*, 152 of 1894 collection! *Barter*, 20200! Yoruba, *Millson!*

Lower Guinea. Congo, *Smith!*

Mozamb. Dist. Zanzibar, *Kirk! Hildebrandt*, 1045! *Bojer!* German East Africa: Zanguebar, *Kirk!* between the coast and Uyui, *Taylor!* Portuguese East Africa: Quilimane, *Scott!*

Also in South Africa, the Mascarene Islands, and Tropical America.

This species differs from all the others in its flattened 2-edged peduncles, and straw-coloured globose spikes.

6. **X. zombana,** *N. E. Br.* Leaves and peduncular-sheath not seen. Peduncle more than 1 ft. long, 1–1⅓ lin. thick, terete or slightly compressed (flat in the dried state), hollow, with a large cavity, striate, glabrous. Spike 3–4 lin. (in fruit up to 6 lin.) diam., subglobose, many-flowered. Bracts 2½–3 lin. long, 2–2½ lin. broad, rather thin and somewhat papery in texture, elliptic-oblong, very obtuse, sometimes faintly keeled at the apex, concave or somewhat boat-shaped, brown, passing into yellowish-brown at the base, nerveless or faintly 3-nerved near the apex, glabrous, not ciliate. Lateral sepals 2½–2¾ lin. long, ⅔ lin. broad, boat-shaped, acute, transparent yellowish-brown; keel very narrowly winged, entire, not ciliate. Petals 2 lin. long, about 1¼ lin. broad, cuneate-obovate, slightly toothed. Arms of the staminodes about ¼ lin. long, oblong, with a small brush-like tuft of comparatively few long yellow hairs.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Zomba, 4000–6000 ft., *Whyte!*

The specimens are about a foot long, and consist of the upper part of the peduncles with their flower-spikes only, so that the plant is probably 1½–2 ft. or perhaps more in height. The peduncles appear to be much less rigid than those of the other African species, as in the process of drying they have become perfectly flat, but when placed in boiling water become nearly terete; they are unusually stout and have a very large central cavity.

7. **X. capensis,** *Thunb. Prodr.* 12. Rhizome more or less creeping. Leaves 1–7 in. long, including the ¾–2½ in. long sheath, ½–1½ lin. broad, linear, acute, glabrous. Peduncular-sheath 1–5 in. long, acute or produced into a leafy point ½–6 lin. long. Peduncle 5–21 in. long, ⅓–¾ lin. thick, terete or slightly compressed, striate, glabrous, hollow. Spike 2–4 lin. long, 3–5 lin. thick, ovoid, ellipsoid or subglobose, usually several-flowered. Bracts 2–3 lin. long, 1½–2½ lin. broad, elliptic or orbicular, obtuse, keeled, concave, thinly coriaceous, entire, not ciliate, 3-nerved, glabrous, blackish-brown; nerves not reticulate at the apex. Lateral sepals 2–3 lin. long, ½–⅔ lin. broad, lanceolate, acute, boat-shaped, yellowish-brown, with the keel and apex darker brown; keel somewhat broadly winged, quite entire and not produced at the apex. Corolla-lobes 1¾–2 lin. long, about 1 lin. broad, cuneate-oblong, obtuse,

minutely toothed. Arms of the staminodes very short, with brush-like tufts of long yellow hairs.—Thunb. Fl. Cap. ed. Schult. 81; Vahl, Enum. ii. 206; Willd. Sp. Pl. i. 255; Roem. & Schultes, Syst. Veg. i. 552; Kunth, Enum. iv. 24; Nilss. in Öfvers. Vet. Akad. Förhandl. Stockh. 1891, 154; and in Svensk Vet. Akad. Handl. xxiv. no. 14, 40; Durand & Schinz, Conspect. Fl. Afr. v. 420; Engl. Pfl. Ost-Afr. C. 133; N. E. Br. in Dyer, Fl. Cap. vii. 6; Rendle in Cat. Afr. Pl. Welw. ii. 68. *X. capensis*, Thunb., var. *nilagirensis*, Engl. Hochgebirgsfl. Trop. Afr. 154. *X. reptans*, Rendle in Cat. Afr. Pl. Welw. ii. 68.

Nile Land. Abyssinia: Begemeder; in swamps on the plain of Jan Meda, 8700 ft., *Schimper*, 1519!

Lower Guinea. Angola: Huilla; in boggy places near the banks of the River Mumpulla; *Welwitsch*, 2473! near the chief stream of Morro de Lopollo, *Welwitsch*, 2459!

Also in South Africa.

Var. *medullosa*, N. E. Brown. Peduncle 5–7½ in. long, very slender, ¼–⅓ lin. thick, with a well developed pith, not in the least hollow. Spike 2 lin. long, about 1½ lin. thick, ovoid, 2–4-flowered. Lateral sepals 1½ lin. long, ½ lin. broad, oblanceolate, acute; keel neither ciliate nor scabrid.

Mozamb. Dist. German East Africa; without precise locality, *Hannington!*

I can find no character to distinguish *X. reptans*, Rendle, from *X. capensis*, Thunb. The leaves are longer than usual, but in that respect it is very similar to Baur's specimen (598) of *X. capensis*, from Bazeia, in Tembuland. A specimen collected by Scott-Elliot (6962) in Nandi, British East Africa, at an alt. of 7000–8000 ft., is probably a form of *X. capensis*, but the leaves appear to be more fleshy than usual. The plant is about 4 in. high.

The variety *medullosa* may prove to be a distinct species, but (with the exception of the peduncle being very slender and having a very distinct pith) I can find no character in the dried state to distinguish it from *X. capensis*. All the specimens I have had the opportunity of examining of *X. capensis* have a hollow stem.

8. **X. nivea,** *Welw. ex Rendle in Cat. Afr. Pl. Welw.* ii. 69. Tufted, slightly bulbous at the base. Leaves 3–5 in. long, including the ½–1 in. long sheath, ¼ lin. thick, filiform-subulate, stiff, erect, flexuose, glabrous. Peduncular-sheath 1½–1¾ in. long, produced into a short leaf-like point at the apex. Peduncle 5–10 in. long, ¼–⅓ lin. thick, slender, wiry, flexuose, subterete, faintly angular, glabrous. Spike 2½–3 lin. long and about as thick, subglobose, few-flowered. Bracts 1½–2 lin. long, 1¼–1¾ lin. broad, broadly elliptic or suborbicular, very obtuse, entire, coriaceous, with submembranous margins, 3–5-nerved, dark brown, with paler margins, slightly shining. Lateral sepals 1¾ lin. long, ½ lin. broad, sigmoid-lanceolate, acute (or obtuse if flattened out); keel light brown, very minutely ciliate from the base to ⅔ the way up; interior sepal bright reddish-purple. Corolla-lobes obovate-elliptic, concave, finely toothed, "white" (*Welwitsch*). Staminodes pilose. Anthers ⅔ lin. long. Capsule obovate. Seeds ellipsoid, pointed, red.

Lower Guinea. Angola: Huilla; in scarcely damp, sunny, wooded places between Lopollo and Monino, *Welwitsch*, 2468!

The filiform leaves, white flowers, and minutely ciliate lateral sepals, easily distinguish this species from its allies.

9. **X. Welwitschii,** *Rendle in Cat. Afr. Pl. Welw.* ii. 68. Leaves 3–6 in. long, 1 lin. or less broad, linear, acute, submembranous, scabrid on the margin. Peduncular-sheath 2–4 in. long, leaf-like, acute. Peduncle 6–14 in. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. thick, somewhat compressed, with longitudinal minutely scabrid ridges. Spike about 4 lin. long, $2\frac{1}{2}$–$4\frac{1}{2}$ lin. thick, ellipsoid when young, hemispherical when mature, several-flowered. Bracts 2–3 lin. long, $1\frac{3}{4}$–$2\frac{1}{2}$ lin. broad, elliptic to obovate, obtuse, not keeled, thin and scarious, becoming somewhat membranous towards the margins, entire, 3-nerved, translucent, light brownish-ochreous or straw-coloured, glabrous, with no dorsal area. Lateral sepals slightly protruding beyond the bracts, 3–$3\frac{1}{4}$ lin. long, $\frac{1}{2}$–$\frac{2}{3}$ lin. broad, lanceolate, acute, dull ochreous; keel most minutely scabrid-ciliolate at the middle, otherwise entire; third sepal crimson. Corolla yellow. Staminodes shortly tufted, pilose. Anthers scarcely 1 lin. long, linear-oblong. Seeds ellipsoid, minutely umbonate at the ends, longitudinally ridged, with transverse inconspicuous bladder-like markings, dull black.

Lower Guinea. Angola: Huilla; in wooded marshy meadows between Lopollo and Monino, *Welwitsch*, 2465!

I do not find the keel of the lateral sepals hispidulous as originally described, but the central part has an exceedingly minute scabrid-denticulation, which can only be seen under a moderately powerful lens.

10. **X. scabridula,** *Rendle in Cat. Afr. Pl. Welw.* ii. 72. Leaves $\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{1}{6}$–$\frac{1}{2}$ lin. broad, linear, mucronate at the apex, very minutely scabrid on the margin. Peduncle 2–$6\frac{1}{2}$ in. long, distinctly striate. Spike $1\frac{1}{3}$–3 lin. long, $\frac{2}{3}$–3 lin. thick, few-flowered. Bracts $1\frac{1}{2}$–$2\frac{1}{4}$ lin. long, $1\frac{1}{4}$–2 lin. broad, orbicular-obovate or suborbicular, very obtuse, sometimes mucronulate, entire, submembranous, obscurely and imperfectly 3-nerved, very light golden-brown. Lateral sepals $1\frac{3}{4}$–2 lin. long, $\frac{1}{2}$–$\frac{2}{3}$ lin. broad, broadly lanceolate, acute, membranous, light brown in the apical part; keel regularly curved from the base to the apex, with an exceedingly narrow wing in the lower part, very minutely ciliate along the middle part; interior sepals light ochreous-brown (always?). Corolla-lobes rather more than 1 lin. long, scarcely $\frac{2}{3}$ lin. broad, obovate, intense yellow. Arms of the staminodes hairy. Ovary oblanceolate. Seeds ellipsoid, umbonate at one or both ends, almost smooth, crimson.

Lower Guinea. Angola: Huilla; on the Serra de Oiahoia, behind Humpatu, in elevated sandy meadows, which are sometimes flooded in summer, *Welwitsch*, 2470!

This species is very similar to *X. affinis*, Rendle, and *X. humpatensis*, N. E. Br., but the lateral sepals are much broader and different in form. I do not find that the leaves are rugulose as originally described, but some of them are slightly wrinkled from shrinkage in drying, as is very often the case.

11. **X. humpatensis,** *N. E. Br.* Leaves $1\frac{1}{4}$–3 in. long, including the $\frac{1}{2}$–1 in. long sheath, $\frac{1}{2}$–1 lin. broad, linear, acute, glabrous; sheath ciliate. Peduncular-sheath $2\frac{1}{2}$–4 in. long, with a leafy acute point 1–2 lin. long, glabrous. Peduncle $\frac{1}{2}$–1 ft. long, $\frac{1}{4}$–$\frac{1}{2}$ lin. thick, subterete, striate, glabrous. Spike $2\frac{1}{2}$–3 lin. long, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. thick,

larger when in fruit, ovoid, ellipsoid, or in fruit subglobose, 4–10-flowered. Bracts all reaching to nearly the same level, 2–2½ lin. long, 1–1½ lin. broad, oblong or broadly obovate-oblong, entire, light olive-brown, rather thin, 3-nerved; the outer very obtuse, slightly keeled; the inner complicate-subacute and keeled at the apex, glabrous. Lateral sepals 2–2¼ lin. long, ⅓ lin. broad, linear-lanceolate, very acute, straw-coloured along the back, membranous and colourless on the sides; keel narrowly winged, slightly curved at about the middle, erect at the apex, minutely and sparsely ciliolate to ½ or ⅔ the way up; interior sepal bright reddish-purple. Petals 2 lin. long, 1½ lin. broad, obovate, obtusely rounded at the apex, scarcely toothed, yellow. Staminodes very shortly 2-armed, with brush-like tufts of long yellow hairs; anthers oblong, at length subhastate at the base.

Lower Guinea. Angola: Humpata; in a pool by the River Neve, *Newton!*

Very like *X. affinis*, Welw., but differing in the narrower lateral sepals which are very acute and erect at the apex.

12. **X. affinis,** *Welw. ex Rendle in Cat. Afr. Pl. Welw.* ii. 70. Tufted. Leaves 2–4½ in. long, including the 1 in. long sheath, ½–1 lin. broad, linear, acute, glabrous; sheaths of the withered leaves persistent, dark brown, ciliate. Peduncular-sheath 2¼–3 in. long, leafless, apiculate. Peduncle 9–10 in. long, ¼–½ lin. thick, subcompressed, glabrous. Spike 2½–3 lin. long and nearly as thick, ellipsoid or obovoid when young, becoming at length subglobose and somewhat flattened at the top, rather few-flowered. Bracts 1½–2¼ lin. long, 1¼–2 lin. broad, broadly elliptic or slightly obovate, obtuse, entire, 3-nerved, subcoriaceous, dark brown with paler subscarious margins, those in the centre of the head deeply concave and much lighter in colour. Lateral sepals 2–2½ lin. long, ⅓–½ lin. broad, narrowly oblanceolate, obtuse and slightly hooded at the apex, somewhat membranous, light yellowish-brown along the keel, darker brown at the apex and pallid straw-coloured at the sides; keel nearly straight in the lower ⅔, rather broadly winged, minutely ciliate and scabridulous from near the base to about ⅓ or ¼ from the apex; interior sepal bright reddish-purple. Petals obovate, yellow. Staminodes 2-armed, pilose. Anthers 1 lin. long, orange in the bud. Capsule oblanceolate, beaked. Seeds as in *X. nivea*.

Lower Guinea. Angola: Huilla; in the elevated damp meadows of Morro de Monino, 5000 ft., *Welwitsch*, 2467!

Very similar to *X. humpatensis*, N. E. Br., and scarcely to be distinguished without dissection, when the rather darker, broader, oblanceolate, obtuse and slightly hooded sepals at once distinguish it.

13. **X. obscura,** *N. E. Br.* Leaves and peduncular-sheath not seen. Peduncles 12–15 in. long, ⅓–½ lin. thick, slightly compressed, glabrous. Spike about 3 lin. long, 2½ lin. thick, ellipsoid, not more than 5–6-flowered. Bracts 2–2½ lin. long, 2 lin. broad, coriaceous, orbicular or broadly elliptic, very obtuse, minutely apiculate, entire, dark chestnut-brown, very minutely papillate-scabrid in the apical part, 5–7-nerved; inner bracts all reaching to about the same level. Lateral

sepals $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long, $\frac{1}{2}$ lin. broad, linear-oblanceolate, somewhat obtuse, but shortly aristate, golden-brown along the keel, colourless and membranous on the sides; keel broadly winged (about $\frac{1}{3}$ as broad as the sides), distinctly ciliate from the base to the apex. Petals 2 lin. long and the same in breadth, broadly obovate, denticulate, bright yellow. Arms of the staminodes with brush-like tufts of long yellow hairs, half as long as the petals. Anthers linear-oblong, 1 lin. long.

Mozamb. Dist. British Central Africa: Mashonaland, at Six-mile Spruit, near Salisbury, *Hon. Mrs. Evelyn Cecil*, 152A !

14. **X. makuensis,** *N. E. Br.* Much branched and densely tufted at the base. Leaves $1\frac{1}{2}$–8 in. long, including the $\frac{3}{4}$–$1\frac{1}{2}$ in. long sheath, $\frac{1}{3}$–$\frac{1}{2}$ lin. thick, filiform-subulate, very slightly compressed. Peduncular-sheath $\frac{2}{3}$–4 in. long, with a subulate point $\frac{1}{3}$–$\frac{3}{4}$ in. long. Peduncles numerous, 3–12 in. long, $\frac{1}{6}$–$\frac{1}{2}$ lin. thick, filiform, subterete or slightly compressed, with a raised line down one side, solid, glabrous. Spike 3–4 lin. long, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. thick, ovoid, becoming somewhat flat-topped and obovoid in fruit, 3–6-flowered. Outer bracts 2–3 lin. long, 1–$1\frac{1}{4}$ lin. broad, oblong, obtuse, keeled, entire, rigidly coriaceous, concave, 3-nerved, blackish-brown, fading to dark olive-brown on the margins, shining; inner bracts similar to the outer, but complicate-acute, more distinctly keeled, 1-nerved, and of a rather lighter olive-brown in the lower part, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long. Lateral sepals 2–$3\frac{1}{4}$ lin. long, $\frac{1}{2}$ lin. broad, linear-lanceolate, acute, boat-shaped, nearly straight, olive-brown, darker along the back; keel with a moderately broad entire wing, neither ciliate nor scabrid, not produced at the apex. Corolla-lobes about $2\frac{1}{2}$ lin. long, 2 lin. broad, cuneate-obovate, toothed, yellow. Arms of the staminodes very short, with large dense brush-like tufts of long yellow hairs. Anthers oblong.

Mozamb. Dist. East Equatorial Africa, *Taylor !* Portuguese East Africa: Makua; Namuli Mountains, *Last !* British East Africa: Nyasaland; Mount Mlanji, *Whyte !* Mlanji Plateau, *McClounie !* and without precise locality, *Buchanan*, 999 !

The subulate-filiform leaves and numerous blackish shining spikes readily distinguish this from the other species.

15. **X. humilis,** *Kunth, Enum.* iv. 15. Leaves $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, very narrowly linear, acute, membranous, striate, glabrous. Peduncles 2–5 in. long, filiform, slightly compressed, glabrous. Spike small, about 2 lin. long, obovate-turbinate, about 3-flowered. Bracts about 7, orbicular-obovate, emarginate, carinate above, with the apex slightly recurved, fuscous on the back, with paler sides and green on the keel in the upper part, subcoriaceous, shining. Lateral sepals narrow, keeled, acute, glabrous. Capsule oblong, umbonate, 1-celled, fuscous, slightly shorter than the bracts. Seeds ellipsoid, ribbed, pointed at each end, pale fuscous.—Nilss. in Svensk. Vet. Akad. Handl. xxiv. no. 14, 40; Engl. Pfl. Ost-Afr. C. 133.

Mozamb. Dist. Zanzibar, ex *Engler*.

Also in Madagascar and Mauritius. I have not seen a specimen from Zanzibar, and therefore give a translation of Kunth's original description.

16. **X. huillensis,** *Rendle in Cat. Afr. Pl. Welw.* ii. 71. Densely tufted. Leaves $\frac{3}{4}$–$2\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{1}{2}$ lin. broad, linear, acute; sheaths with membranous margins. Peduncular-sheath about as long as the leaves, acute or with a short leafy point. Peduncle 3–12 in. long, $\frac{1}{5}$–$\frac{1}{3}$ lin. thick, filiform, slightly angular, reddish below. Spike about 2 lin. long, $1\frac{1}{2}$–2 lin. thick, ellipsoid, becoming subglobose in fruit, about 6-flowered. Bracts $1\frac{1}{3}$–$1\frac{3}{4}$ lin. long, $\frac{2}{3}$–1 lin. broad, elliptic-oblong, very obtuse, subcoriaceous, rather stoutly keeled in the upper half, entire, 3-nerved (sometimes incompletely), light brown, slightly shining. Lateral sepals $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad, broadly lanceolate, acute, light brown along the keel, membranous and nearly colourless on the sides; keel narrow, quite entire. Corolla-lobes $1\frac{1}{3}$ lin. long, $\frac{3}{4}$ lin. broad, obovate, yellow. Arms of the staminodes densely pilose, bright yellow. Anthers subsagittate. Ovary compressed-ellipsoid, becoming obovoid and shortly rostrate as it ripens. Seeds ellipsoid, narrowing to a slight umbo at each end, crimson, with dark longitudinal lines.

Lower Guinea. Angola: Huilla; Empalanca, in lofty sandy pastures, flooded in the rainy season, *Welwitsch*, 2469! marshes near the River Quipumpunhime, in the Humpata district between Nene and Humpata, *Welwitsch*, 2472!

17. **X. anisophylla,** *Welw. ex Rendle in Cat. Afr. Pl. Welw.* ii. 72. Leaves 2–$3\frac{1}{2}$ in. long, $\frac{2}{3}$–$\frac{3}{4}$ lin. broad, linear, acute. Peduncular-sheath $1\frac{1}{2}$–2 in. long, acute. Peduncle 5–$8\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. thick, "of a shining copper or almost gold colour" (*Welwitsch*). Spike 2 lin. long, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. broad, ellipsoid, somewhat truncate at the apex, often becoming hemispherical when mature, 5-flowered. Bracts $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, $1\frac{1}{3}$–$1\frac{1}{2}$ lin. broad, orbicular-obovate to broadly elliptic, very obtuse, sometimes faintly keeled in the upper part, entire, membranous, 3-nerved, very light reddish-brown, with broad transparent straw-coloured margins. Lateral sepals $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, scarcely $\frac{1}{2}$ lin. broad, somewhat oblong-lanceolate, acute or subacute, membranous, nearly colourless, very light brownish or straw-coloured along the back; keel very narrow, quite entire. Petals (torn) more than $1\frac{1}{2}$ lin. long, scarcely 1 lin. broad, yellow. Staminodes 2-armed, with dense tufts of yellow hairs, more than half the length of the stamens. Anthers $\frac{3}{4}$ lin. long, oblong, cordate at the base. Fruit scarcely $1\frac{1}{2}$ lin. long, plano-convex, narrowly obovoid, very shortly beaked. Seeds ellipsoid, with an apical umbo, longitudinally marked with distinct spiral ridges, red.

Lower Guinea. Angola: Pungo Andongo; in spongy places in the Præsidium, near the huge rocks of the Barrancos de Catete, *Welwitsch*, 2463.

18. **X. fugaciflora,** *Rendle in Cat. Afr. Pl. Welw.* ii. 71. Cæspitose. Leaves $\frac{1}{2}$–4 in. long, $\frac{1}{5}$–$\frac{1}{2}$ lin. broad, linear, acute, transversely rugulose; scabridulous at the margin, especially when old. Peduncular-sheath $\frac{1}{2}$–2 in. long, with a leafy point $1\frac{1}{4}$–3 lin. long. Peduncle 3–9 in. long, $\frac{1}{6}$–$\frac{1}{4}$ lin. broad, very slender, flattened, glabrous. Spike $1\frac{2}{3}$–$2\frac{1}{4}$ lin. long, 1 to nearly 2 lin. thick, 4–5-flowered, ellipsoid when in flower, becoming semi-ellipsoid in fruit. Bracts $1\frac{1}{3}$–2 lin. long, $\frac{2}{3}$–$1\frac{1}{2}$ lin. broad, varying from elliptic to orbicular, very obtuse, membranous,

entire, 3- or indistinctly 5–7-nerved, dull or purplish-brown, the colour fading out towards the margins. Lateral sepals 1½–2 lin. long, ½ lin. broad, oblong-lanceolate, obtuse, membranous, transparent, tinted with red or brown on the keel, nearly colourless on the sides; keel moderately broad, quite entire. Corolla-lobes scarcely 2 lin. long, obovate, toothed on the margin, yellow. Arms of the staminodes with brush-like tufts of hairs. Anthers oblong, 2–3 lin. long. Ovary oblanceolate, shortly beaked. Seeds ellipsoid, with a prominent apical umbo, longitudinally striate, reddish-brown.

Lower Guinea. Angola: Pungo Andongo; spongy places between Caghuy and Sansamanda, but somewhat rare, *Welwitsch*, 2461! in spongy wooded meadows at Mutollo, near Pedras de Guinga, *Welwitsch*, 2462! plentiful in the Præsidium, in spongy places on the higher rocks of Catete, *Welwitsch*, 2464!

The minute rugosity on the leaves in this species and in *X. straminea*, Nilss., and one or two others is probably due to some form of shrinkage in drying, as some of the leaves show no trace of it.

19. **X. straminea,** *Nilss. in Öfvers. Vet. Akad. Förhandl. Stockh.* 1891, 153. Roots filiform, densely tufted; no rhizome. Leaves ⅓–5 in. long, ⅓–1 lin. broad, linear, acute, rarely obtuse, often from shrinkage (but not always) minutely transversely rugulose in the dried state, with concolorous or pale sheaths ¼–1½ in. long. Peduncular-sheath ½–2 in. long, leafless and mucronate, or with a leafy point ¼–½ in. long. Peduncle 1½–12 in. long, very slender, ⅕–⅓ lin. thick, terete or subcompressed, striate, very minutely rugulose in the upper part, slightly hollow. Spike 2–2½ lin. long, lanceolate, acute, 1½ lin. in diam. when in flower, opening out when in fruit, 1–5-flowered. Bracts few, 1½–2¾ lin. long, ¾–1 lin. broad, oblong or elliptic-oblong, the inner boat-shaped, keeled, and complicate-acute at the apex, but obtuse when flattened out, entire, not ciliate, 3-nerved, somewhat membranous, very pale brownish or straw-coloured. Lateral sepals about 2–2½ lin. long, ⅓–½ lin. broad, straight, narrowly lanceolate, acute, membranous, straw-coloured; keel slightly rounded, with no trace of a wing, entire, not ciliate. Corolla only seen in a very young bud, yellow. Capsule 1½–1¾ lin. long, ⅔ lin. diam., oblong, obtuse, apiculate, trigonous (or acutely triangular?) in cross section.—Nilss. in Svensk. Vet. Akad. Handl. xxiv. no. 14, 40; Durand & Schinz, Consp. Fl. Afr. v. 421; N. E. Br. in Dyer, Fl. Cap. vii. 751. *X. filiformis*, N. E. Br. in Dyer, Fl. Cap. vii. 7, not of Lam.

Upper Guinea. Niger Territory: Nupe; swamps near Bakona, and at Lom, *Barter*, 764!

Mozamb. Dist. British Central Africa: Nyasaland; Tanganyika Plateau at Fort Hill, 3500–4000 ft., *Whyte!*

Also in South Africa.

This species is closely allied to *X. filiformis*, Lam., but differs in having no dorsal area on the outer bracts and no ciliation on the keel of the lateral sepals. The curious and minutely rugulose surface of the leaves and peduncles is best seen by holding the specimens in a line with the source of light, but probably it is due to shrinkage in drying, and may not be evident in the living plants. An imperfect specimen collected by Carson in a pool 2–3 miles south of Niomkolo, in Urungu, may also belong to this species.

20. **X. pumila,** *Rendle in Cat. Afr. Pl. Welw.* ii. 70. A small rigid plant, densely tufted. Rhizome bearing several crowded branches. Leaves distichous, 2–3½ in. long, including the ¾ in. long sheath, scarcely ½ lin. broad, linear, very acute or subaristate at the apex; sheaths dark chestnut-brown. Peduncle 4–5½ in. long, ¼ lin. thick, terete, glabrous. Spike 2¼–2½ lin. long, 1–1½ lin. broad, about 3-flowered, narrowly ellipsoid, slightly drawn out at the base. Bracts 1⅔–2 lin. long, ¾–1½ lin. broad, elliptic or oblong, entire, coriaceous, minutely papillate-scabrid on the back of the apical part, 3-nerved, dark chestnut-brown, slightly paler at the margin, those in the centre dull ochreous-brown. Lateral sepals 1¾–2 lin. long, nearly ½ lin. broad, lanceolate, obtuse, golden-brown along the keel, becoming paler towards the margins; keel very minutely scabridulous from about ⅓ above the base to the apex. Corolla bright yellow. Staminodes 2-armed, hairy. Anthers ¾ lin. long, linear-oblong, orange-yellow.

Lower Guinea. Angola: Huilla; in thicket-grown marshes between Humpata and the lofty plain of Empalanca, *Welwitsch*, 2471 !

21. **X. multicaulis,** *N. E. Brown.* Leaves 1½–3 in. long, ½–1 lin. broad, linear, subacute, sometimes slightly hardened and whitish at the apex, glabrous, sometimes minutely rugulose in the dried state. Peduncular-sheath 1¼–2 in. long, with a short leafy point. Peduncles numerous, 4–6 in. long, ¼–⅓ lin. thick, angular, compressed, glabrous, twisted. Spike 2½–3 lin. long, 1–1¼ lin. thick, lanceolate, 2–3-flowered, dull smoky-brown. Outer bracts 1½–2 lin. long, thin, broad, elliptic, subacute or obtuse, deeply concave, slightly keeled at the apex, entire, subcoriaceous, indistinctly 3-nerved, dull brown; inner bracts thinner, orbicular, apiculate, closely convolute, scarcely keeled, nerveless. Lateral sepals 2–2¼ lin. long, ½ lin. broad, lanceolate, acute, boat-shaped, thin, scarcely keeled, light straw-coloured, scarcely darker on the keel, which is quite entire. Corolla-lobes 1 lin. long, ¾ lin. broad, obovate, very obtuse, yellow. Arms of the staminodes broad, linear, densely fringed with yellow hairs.

Mozamb. Dist. British Central Africa: Nyasaland; Namasi, *Cameron*, 51 !

22. **X. angustifolia,** *De Wild. & Durand in Comptes-rendus Soc. Bot. Belg.* xxxviii. 149. Leaves 2–4 in. long, ¼–⅓ lin. broad, linear, acute, slightly twisted, rigid, with brown sheaths 7 lin. long. Peduncular-sheath 1¾–2⅓ in. long, leafless, acute, keeled on the back, bright chestnut in the lower part. Peduncles ½–1 ft. long, more or less flattened, glabrous. Spike small, about 2½ lin. long, 1½ lin. in diam. Inner bracts 2 lin. long, 1 lin. broad, outer smaller, obovate or elliptic, sparsely ciliolate and usually shortly emarginate at the apex, coriaceous, bright fuscous. Lateral sepals about 2 lin. long, oblong, curved, keeled; keel scarcely or very narrowly winged, not ciliate. Petals about 1½ lin. long, 1 lin. broad, obovate, fimbriate, yellow.

South Central. Congo Free State: Upper Congo; between Mokanga and Skori, *Dewèvre.*

I have not seen this species; it appears to be allied to *X. multicaulis*, N. E. Br., or *X. filiformis*, Lam.

23. **X. erubescens,** *Rendle in Cat. Afr. Pl. Welw.* ii. 73. Plant about 8 in. high, "scarcely cæspitose" (*Welwitsch*). Leaf-sheaths forming a bulbous base, leafless in the specimens seen, the outer coriaceous or scarious, tapering from a broad base, smoky-brown, shining. Peduncles arising from the midst of the persistent bases of the leaves, $5\frac{1}{2}$–8 in. long, flexuose, subquadrangular, glabrous, green. Peduncular-sheath about 2 in. long, rather loose above and passing into a weak acuminate point. Spike $\frac{1}{4}$ in. thick, ellipsoid or subglobose. Bracts 2–$2\frac{1}{2}$ lin. long, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. broad, coriaceous, lowermost oblong, the others orbicular, very concave, obtuse or slightly apiculate, entire, but often broken and retuse at the apex, 7–9-nerved, olive-brown, paler at the margin. Lateral sepals $2\frac{1}{4}$–$2\frac{1}{3}$ lin. long, scarcely $\frac{1}{2}$ lin. broad, falcate, with very unequal sides; keel broad, minutely denticulate-scabrid (scarcely ciliolate) from about the middle to the apex, greenish-brown below, becoming crimson above. Arms of the staminodes with narrow brush-like tufts of hairs, exceeding the oblong orange-coloured anthers.—Rendle in Journ. Bot. 1899, 508.

Lower Guinea. Angola: Huilla; here and there in marshy pastures near Nene, by the road towards Lopollo, *Welwitsch*, 2466!

A very distinct species, well marked by the bulbous base formed by the leaf-sheaths. A specimen collected by Rand in Rhodesia has been referred (Journ. Bot., 1899, 508) by Dr. Rendle to this species, but as the leaves of Welwitsch's plant are unknown, and Rand's specimen only consists of separate peduncles and leaves, the base of the plant not being represented, it is uncertain if the Rhodesian plant, which has terete-flliform leaves, really belongs to this species, although the spikes are similar.

24. **X. filiformis,** *Lam. Encycl.* i. 132. Leaves $\frac{3}{4}$–$2\frac{3}{4}$ in. long, $\frac{1}{4}$–$\frac{1}{2}$ lin. broad, linear, subacute, glabrous. Peduncle $4\frac{1}{2}$–10 in. long, $\frac{1}{6}$–$\frac{1}{3}$ lin. thick, terete, striate. Spike $2\frac{1}{2}$–3 lin. long, 1–$2\frac{1}{4}$ lin. thick, ovoid or ellipsoid, few-flowered. Bracts $1\frac{1}{2}$–2 lin. long, 1–$1\frac{1}{3}$ lin. broad, elliptic or suborbicular, obtuse, very concave, chestnut-brown, the outer with a linear greyish dorsal area near the apex, glabrous, entire, coriaceous, becoming somewhat scarious at the margin, 3–5-nerved. Lateral sepals $1\frac{1}{2}$–2 lin. long, narrowly spathulate-lanceolate, subobtuse, keeled, light brown along the keel, paler on the membranous sides; keel very minutely scabrid on the apical part only.—Poir. Encycl. viii. 821; Vahl, Enum. ii. 207; Kunth, Enum. iv. 24; Nilss. in Öfvers. Vet. Akad. Förhandl. Stockh. 1891, 151; and in Svensk. Vet. Akad. Handl. xxiv. no. 14, 40; Durand & Schinz, Consp. Fl. Afr. v. 420.

Upper Guinea. Senegal, *in Upsala Herb.* Sierra Leone, *Smeathman! Afzelius, in Stockholm and Berlin Herb.*

Lamarck described this species from a specimen collected by Smeathman, of which I have seen a tracing, and also specimens of the same gathering in the British Museum.

25. **X. angularis,** *N. E. Brown.* Leaves and peduncular-sheath not seen. Peduncle 14–18 in. high, about ½ lin. thick, distinctly 4–6-angled, hollow, glabrous. Spike 3–4 lin. long, 2½–3 lin. thick, ellipsoid, about 10-flowered. Bracts 2–2½ lin. long, 1½ lin. broad, elliptic, very obtuse, not keeled, concave, glabrous, rather light brown with a distinct greyish lanceolate or lanceolate-oblong dorsal area; nerves numerous, much reticulated. Lateral sepals 2½ lin. long, ¼–⅓ lin. broad, falcate-linear, acute, keeled, brown, paler towards the margins; keel not produced at the apex, serrulate along the apical half, with the teeth often ending in a fine hair. Corolla not seen.

Upper Guinea. Niger Territory: Nupe, *Barter!*

This species is easily recognised by its sharply angular peduncles, combined with the distinct dorsal area of the bracts.

26. **X. decipiens,** *N. E. Br. in Dyer, Fl. Cap.* vii. 3. Leaves 5–16 in. long, 1½–2½ lin. broad, with concolorous sheaths 1¼–3 in. long, linear, acuminate, glabrous. Peduncular-sheath 5½–7½ in. long, acute and leafless, or (abnormally?) with a distinct blade like the other leaves. Peduncle 2–2½ ft. long, 1–1⅓ lin. thick, terete, sulcate-striate, glabrous; pith rather loose, not hollow at the centre. Spike 6–9 lin. long, 5–6 lin. thick, ovoid, acute or subacute, 30–40-flowered. Bracts 3–3½ lin. long, 2½–2¾ lin. broad, oblong-obovate, very obtuse, minutely subdenticulate, concave, 7–9-nerved, light chestnut-brown, slightly shining, with a distinct oblong-lanceolate greyish dorsal area about 1–1¼ lin. long and ½ lin. broad; nerves reticulate at their apex. Lateral sepals 2½ lin. long, ½ lin. broad, pale brown, linear-falcate or linear-lanceolate, acute, keeled; keel winged, serrulate along the upper part. Corolla only seen in bud. Arms of the staminodes very short ending in dense brush-like tufts of long hairs. Anthers linear-oblong. Capsule 2½ lin. long, oblong-lanceolate, subacute, trigonous.—*X. laxifolia*, Benth. in Hook. Niger Fl., 548, not of Mart.

Upper Guinea. Sierra Leone: Samu Country, *Scott-Elliot*, 4220! and without precise locality, *Smeathman!*

Lower Guinea. Angola, *Curror!*

This is the stoutest of all the African species, and the dorsal area on the bracts is more conspicuous than in any other. The pubescence on the keel of the lateral sepals, mentioned in my original description, seems to be due to some accidental disintegration of the superficial cells in the specimens first examined, and does not occur in the Sierra Leone example. Since this species was described it has been discovered that the plants collected by Curror and labelled "W. Africa, S. of the Tropic," were all collected in Angola.

27. **X. Barteri,** *N. E. Br.* Leaves not seen. Peduncular-sheath 2½ in. (or more?) long, terminated by a linear acute leaf 2 in. long, ⅔ lin. broad, glabrous. Peduncle 1½–2 ft. long, ½–¾ lin. thick, somewhat compressed, 2-edged, hollow, glabrous, striate (from shrinkage?). Spike 3 lin. long, 2–2½ lin. thick, ellipsoid or ovoid, 7–12-flowered. Bracts spirally imbricate one above another, 2¼–2½ lin. long, 1½ lin. broad, coriaceous, elliptic or elliptic-oblong, obtuse, entire, sometimes

apiculate, light chestnut-brown, the inner with a stout usually dark green keel; nerves very indistinct, very slender and irregular. Lateral sepals $1\frac{3}{4}$–2 lin. long, $\frac{1}{2}$ lin. broad, falcate-lanceolate, obtuse, boat-shaped, brown along the back, fading to light yellowish-brown on the sides; keel winged, minutely ciliolate along the middle part only, not produced at the apex. Flowers not seen. Capsule obovoid, trigonous.

Upper Guinea. Niger Territory: Nupe, *Barter!*

Allied to *X. angularis*, N. E. Br., but differing in its compressed (not acutely angled) peduncles, the absence of a dorsal area on the bracts, and other characters.

28. **X. batokana,** *N. E. Br.* Tufted on a stout rootstock, emitting thick roots. Leaves 4–8 in. (or more?) long, $\frac{3}{4}$–$1\frac{1}{2}$ lin. broad, linear, very acute, rigid, striate, often twisted, glabrous. Peduncular-sheath $2\frac{1}{2}$–4 in. long, with a rigid acute point about 3 lin. long, glabrous. Peduncle $1\frac{1}{2}$–2 ft. long, about $\frac{2}{3}$ lin. thick, subterete, very smooth and slightly shining, not striate, glabrous; pith not hollow at the centre. Spike 4–5 lin. long, 3–$3\frac{1}{2}$ in. thick, ellipsoid or subglobose, about 30-flowered. Bracts $1\frac{3}{4}$–$2\frac{1}{4}$ lin. long, $1\frac{1}{3}$–$1\frac{1}{2}$ lin. broad, elliptic or elliptic-oblong, very obtuse, neither apiculate nor keeled, 5–7-nerved, chestnut-brown, with an indistinct slightly paler lanceolate dorsal area, glabrous, not ciliolate; nerves reticulated at their apex. Lateral sepals 2 lin. long, nearly $\frac{1}{2}$ lin. broad, linear-falcate, acutely keeled, brown, paler towards the margins; keel very distinctly ciliate from a little above the base to the minutely apiculate apex. Corolla yellow; tube about 2 lin. long; lobes 2 lin. long, 1 lin. broad, cuneate-obovate, denticulate. Arms of the staminodes small, bearing a tuft of comparatively few (20–25) hairs. Anthers oblong.

Mozamb. Dist. British Central Africa: Northern Rhodesia; Batoka Highlands, *Kirk!*

This much resembles *X. nitida,* Nilss., but the very smooth peduncles and absence of cilia on the bracts readily distinguish it.

29. **X. congensis,** *Büttner in Verhandl. Bot. Ver. Brandenb.* xxxi. 71. Leaves up to 1 ft. long, 1–2 lin. broad, linear, slightly scabrous, striate, with dark brown sheaths. Peduncle 2–3 times as long as the leaves, compressed, smooth. Spike 5 lin. long, $2\frac{1}{2}$ lin. thick, about 20-flowered. Bracts $2\frac{1}{2}$ lin. long, broadly obovate, rounded at the apex, ciliolate, chestnut-brown with a greyish dorsal area. Lateral sepals shorter than the bracts, boat-shaped, keeled, hyaline, pale fuscous, with a golden hue, the apex and keel darker; keel narrowly winged, ciliate. Corolla-lobes $1\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad, truncate, irregularly and shortly denticulate, yellow.—Nilss. in Svensk. Vet. Akad. Handl. xxiv. no. 14, 29; Durand & Schinz, Consp. Fl. Afr. v. 420, and Études Fl. Congo, i. 268.

South Central. Congo Free State: on the left bank of the River Congo, between Lukolela and Equatorville, *Büttner*, 583.

I have not seen this, but possibly *X. nitida,* Nilss., may be the same plant.

30. **X. nitida,** *Nilss. in Öfvers. Vet. Akad. Förhandl. Stockh.* 1891, 156. Tufted on a thick rootstock, emitting rather stout flattened roots. Leaves 9–14 in. long, $\frac{2}{3}$–1 lin. broad, linear, acute, twisted, glabrous; sheaths $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, becoming dark chestnut-brown and shining. Peduncular-sheath 4–5 in. long, with a flat point 2–3 lin. long, glabrous, dark chestnut-brown in the lower part. Peduncle $1\frac{1}{2}$–2 ft. long, compressed, 2-edged, glabrous, finely striate; pith not hollow at the centre. Spike 5–7 lin. long, 3–$3\frac{1}{2}$ lin. thick, ovoid or oblong-ovoid, about 30- or more-flowered. Bracts $2\frac{1}{2}$–3 lin. long, $1\frac{1}{2}$ lin. broad, elliptic-oblong, very obtuse, minutely ciliate at the apex, dark brown, shining, with an obscure oblong dorsal area on some of them, obscurely 7-nerved, nerves scarcely reticulated. Lateral sepals $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin. broad, oblong-linear, slightly falcate, usually more or less hooded and ciliate at the apex, keeled, yellowish-brown with a dark brown keel; keel ciliate or irregularly toothed and ciliate to the apex, which is produced into a short subulate point. Corolla-tube 2 lin. long; lobes 2 lin. long, $\frac{3}{4}$ lin. broad, oblong, obtuse. Arms of the staminodes short, linear, terminating in a small dense tuft of long yellow hairs. Anthers oblong.—Nilss. in Svensk. Vet. Akad. Handl. xxiv. no. 14, 30; Durand & Schinz, Consp. Fl. Afr. v. 421, not of Willd.

Lower Guinea. Corisco Island: in meadow ground, *Mann*, 1858!

As the flowers are in a bad state I am rather doubtful if the description of corolla-lobes as given above is quite correct. In one head some of the bracts have a well-marked ciliate keel down the back, the other bracts of the same head being without a keel, which latter seems to be the normal condition. This species may prove to be the same as *X. congensis*, Büttner, but the leaves are not scabrous as described for that species; if they should be found to be identical, the name *X. congensis* must take precedence, as that species was published in September 1889 (not 1890 as stated by Nilsson), nearly two years earlier than *X. nitida*.

31. **X. Hildebrandtii,** *Nilss. in Öfvers. Vet. Akad. Förhandl. Stockh.* 1891, 155. Tufted. Leaves 4–12 in. long, $\frac{3}{4}$–$1\frac{1}{2}$ lin. broad, linear, very acute, striate, often twisted, glabrous. Peduncular-sheath $2\frac{1}{2}$–$4\frac{1}{2}$ lin. long, with a rigid acute point $2\frac{1}{2}$–3 lin. long. Peduncle $1\frac{1}{2}$–2 ft. long, 1 lin. thick, compressed, slightly striate. Spike $3\frac{1}{2}$–7 lin. long, about 3 lin. thick, ovoid or cylindric-oblong, 10–30- or more-flowered. Bracts $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, $1\frac{1}{2}$ lin. broad, spirally imbricating one above another, elliptic-oblong or suborbicular, very obtuse, sometimes minutely apiculate, not keeled, glabrous, opaque blackish-brown, indistinctly 5–9-nerved; nerves reticulate at their apex. Lateral sepals 2 lin. long, $\frac{1}{2}$–$\frac{2}{3}$ lin. broad, falcate-oblong, or the margins nearly straight and the keel much curved, brown with paler margins; keel winged, obtuse or slightly produced at the apex, very distinctly ciliate from the base to the apex, the cilia usually being grouped in small dense tufts. Corolla-lobes 2 lin. long, $1\frac{3}{4}$ lin. broad, cuneate-orbicular, toothed. Arms of the staminodes linear, with dense brush-like tufts of yellow hairs.—Engl. Pfl. Ost-Afr. C. 133. *X. Umbilonis*, Rendle in Cat. Afr. Pl. Welw. ii. 67, hardly of Nilss.

Lower Guinea. Angola: Pungo Andongo; in damp meadows by the banks

of the Cuanza River, near Bumba, *Welwitsch*, 2460! Huilla; Humpata, in spongy marshes at the foot of the Sierra de Oiahoia, *Welwitsch*, 2475!

Mozamb. Dist. German East Africa and the region around Lake Nyasa, *ex Engler*. British Central Africa: Nyasaland; Shire Highlands, *Buchanan!* Mount Malosa, 4000–6000 ft., *Whyte!* Mount Zomba, 4000–6000 ft., *Whyte!*

Also in Madagascar.

This Tropical African plant differs from the typical Madagascar form in that the peduncles are more slender, and the cilia on the keels of the lateral sepals have a tendency to be grouped in tufts, instead of being evenly spread as in typical *X. Hildebrandtii*, but in other respects the two plants closely agree. *X. Umbilonis*, Nilss., under which Rendle has placed it, differs in having the keel of the lateral sepals produced at the apex, but may, perhaps, only be a local form: it was collected in Natal. *X. Hildebrandtii* is distinguished from all other Tropical African species, by its dull blackish-brown many-flowered spikes, and distinctly ciliate sepals.

Imperfectly known species.

32. **X. minima,** *Steud. Syn. Pl. Glum.* ii. 288. Roots fibrous, very slender. Peduncular-sheath lax, terminated by a flattish or setaceous leafy point 3–5 lin. long. Peduncle 1½–3 in. long, capillary or filiform, Spike small. Bracts ovate-oblong, obtuse, pale chestnut-brown. Lateral sepals lanceolate-spathulate.—*X. humilis*, var. *minima*, Nilss. in Öfvers. Vet. Akad. Förhandl. Stockh. 1891, 152; and in Svensk. Vet. Akad. Handl. xxiv., no. 14, 40; Durand & Schinz, Consp. Fl. Afr. v. 420.

Upper Guinea. Los Islands, *Jardin*, 120, in *Stockholm Herb.*

I have not seen a specimen of this plant, and the description is insufficient for its identification, but it would appear to be allied to *X. straminea*, Nilss., or *X. filiformis*, Lam.

ORDER CXLIII. **COMMELINACEÆ.** (By C. B. Clarke.)

Flowers small, bisexual or some sterile. Sepals 3, one entirely external in the bud. Petals 3, free or their claws imperfectly united into a tube in *Cyanotis*. Stamens 6, whereof 4–1 are often sterile and deformed or wanting; filaments often with beaded hairs. Ovary superior, 3–2-celled; when 3-celled the dorsal cell often smaller with fewer ovules or empty; style simple; ovules 1 or several in each cell attached to the inner angle. Fruit (except in the two first small genera) a loculicidal capsule. Seeds having the hilum linear, vertical (except in the two first genera); embryo small, far from the hilum, shortly cylindric in the floury albumen; foramen prominent, covered by an embryostega, lateral (*i.e.* nearly opposite the hilum), except in *Cyanotis*.—Herbs. Leaves alternate, ovate to linear, bases sheathing.

Species 330, in all warm countries.

Mostly succulent weedy plants, with fugitive flowers. In some genera the flowers are symmetric or nearly so; but in the majority the flower is 1-sided, the dorsal cell of the ovary smaller or 0, the dorsal petal much shorter than the other two, and the 3 dorsal stamens sterile or rudimentary.

Tribe I. **Polliceæ.**—*Fruit indehiscent. Inflorescence a panicle; no spathaceous bracts.*

Fruit crustaceous. Margin of leaves nearly glabrous .	1. POLLIA.
Fruit succulent. Margin of leaves brown-silky .	2. PALISOTA.

Tribe II. **Commelineæ.**—*Capsule* 2–3-*valved. Fertile stamens* 3–2.

Racemes 2–1, enclosed or half-enclosed within a spathe-like folded bract.

Spathes scattered or clustered	3. COMMELINA.
Spathes on the elongate branches of the panicle .	4. POLYSPATHA.

Inflorescence various; without conspicuous folded bracts.

Sepals small, obtuse	5. ANEILEMA.
Sepals ½ in. long, lanceolate, acute . . .	6. ANTHERICOPSIS.

Tribe III. **Tradescantieæ.**—*Capsule* 2–3-*valved. Fertile stamens* 6–5:

Capsule 3-celled.

Seeds 4–10 in each cell. Panicle loose . .	7. BUFORRESTIA.
Seeds 2–1 in each cell. Cymes often dense.	
Peduncle perforating the base of the leaf-sheath	8. FORRESTIA.
Peduncle not perforating the leaf-sheath .	9. CYANOTIS.
Capsule 2-celled, with 1 ovule in each cell . .	10. FLOSCOPA.

1. POLLIA, Thunb.; Benth. et Hook. f. Gen. Pl. iii. 846.

Sepals 3. Petals 3, small, obovate, white or pale rose. Stamens 6 subequal, or 3 and 3 staminodes; filaments without hairs. Ovary ovoid; cells 3, equal or the dorsal smaller, 5–10-ovuled (in the African species). Capsule globose or ellipsoid, indehiscent; pericarp crustaceous, ultimately shining blue or lead-coloured; seeds 5–10 in each cell, flattened trapezoid.—Stem often rooting at the base. Leaves lanceolate or obovate-lanceolate, approximate towards the top of the stem; not densely brown-silky on the lower surface near the margin. Panicle terminal, either loose, or dense short-ovoid. Bracts within the panicle small.

Species 14, scattered in the warmer parts of the Old World.

Fertile stamens 6; panicle loose	1. *P. Mannii.*
Fertile stamens 3; head dense	2. *P. condensata.*

1. **P. Mannii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 124. Nearly glabrous. Stems 1–2 ft. long, slender, trailing or suberect, rooting at the base. Leaves 4 by 1 in., broadly lanceolate, acuminate at either end; pseudo-petiole ¼–½ in. long. Panicle 2 by 1½ in., 12–18-flowered, loose; bracts up to ⅓ in. long, lanceolate. Stamens 6 fertile, subequal. Capsule ⅕ by ⅛ in., 24-seeded.—Durand & Schinz, Consp. Fl. Afr. v. 421; Hua in Bull. Soc. Bot. France, xli. p. 1.

Upper Guinea. Cameroons; Yaunde, 2700 ft., *Zenker & Staudt,* 409!

Lower Guinea. Isle of St. Thomas: 2000 ft., *Mann,* 1098! at Angolares,

300 ft., *Quintas*, 10 ! at Nova Moka, 2900 ft., *Moller ! Fl. Afr. Exsicc. Conimbric.*, 109 !

Part of Welwitsch, 6604, was referred by me erroneously to *P. Mannii* in DC. Monogr. Phan. iii. 124.

2. **P. condensata,** *C. B. Clarke in DC. Monogr. Phan.* iii. 125. Nearly glabrous. Stems 2–6 ft. long, thick. Leaves 12 by 3 in., lanceolate-obovate, acuminate at either end; petiole 0–$\frac{1}{3}$ in. long. Panicle $1\frac{1}{2}$ by $1\frac{1}{4}$ in., 20–40-flowered, dense; bracts $\frac{1}{4}$–$\frac{1}{3}$ in. long, ovate, obtuse, conspicuous on the young panicle, disappearing in fruit; peduncle 1–2 in. long, with sometimes a large oblong bract. Stamens 3 fertile. Capsule $\frac{1}{5}$ by $\frac{1}{8}$ in., 24-seeded.—Durand & Schinz, Consp. Fl. Afr. v. 421; K. Schum. in Engl. Pfl. Ost-Afr. C. 134; Hua in Bull. Mus. Hist. Nat. Par. i. 118, and in Bull. Soc. Bot. France, xli. p. l; Cornu in Bull. Soc. Bot. France, xliii. 27; Cummins in Kew Bulletin, 1898, 80; Rendle in Cat. Afr. Pl. Welw. ii. 74.

Upper Guinea. Sierra Leone; Talla Hill Plateau, *Scott-Elliot*, 4851 ! near Dunnia, *Scott-Elliot*, 4863 ! Ashanti; Assin-Yan-Kumassi, *Cummins*, 82 ! Cameroons: Efulen, *Bates*, 389 ! Fernando Po; 2000 ft., *Mann*, 93 ! *Barter*, 1518 ! *Vogel*, 7B !

Nile Land. British East Africa: Uganda; common in woods, *Scott-Elliot*, 7370 !

Lower Guinea. Isle of St. Thomas: Obo de Macambrara, 4200 ft., *Moller*, 12 ! Angolares, near Rio Salgado, *Quintas*, 12A ! *Fl. Afr. Exsicc. Conimbric.*, 110 ! Princes Island, *Barter*, 2020 ! Angola: Cazengo; in the lofty woods of Muxaulo, *Welwitsch*, 6604 !

Mozamb. Dist. ? Eastern Africa: Mhonda, *Sacleux*, 1831 !

This was erroneously placed in Sect. *Eu-Pollia* (*i.e.*, with 6 perfect stamens) in DC. Monogr. Phan. l.c. It has since flowered at Kew, and Mr. Rolfe observed that the perfect stamens were 3 only (*i.e.*, it is of Sect. *Aclisia*).

2. **PALISOTA,** Reichb.; Benth. et Hook. f. Gen. Pl. iii. 847.

Sepals 3. Petals 3, small, obovate, white, sometimes tinged with rose or bluish. Stamens 3, perfect, the anther of the stamen of the interior whorl (anticous apparently middle of the three) somewhat unlike that of the other two, with curved or subdivergent cells; staminodes 2 or 3, with beaded hairs. Ovary 3-celled, the posticous cell often smaller; ovules 8–1 in each cell. Fruit indehiscent. fleshy or succulent, often purple or red; seeds 2 superposed in each cell, or solitary, or more numerous and irregularly packed, pyramidal or trapezoid.—Stem simple, or nearly so, or hardly any. Leaves basal or in false whorls, hairy when young, edges permanently and densely clothed with ferruginous hairs. Peduncle 1, rarely 2–3, quasi-terminal; inflorescence a panicle, elongate or dense; flowers in small cymes, many functionally male, the lower pedicels of the cyme often early caducous, so that the upper part of the cyme-peduncle appears knotted. Bracts on the axis of the panicle short, except in *P. bracteosa;* bracteoles small or 0.

Species. The 12 following endemic in Tropical Africa.

*Monostichos.—Seeds 3–1 in each cell, superposed in one row (fruit not known in *P. Mannii*).

Pedicels not articulated at the base.	
Stems nearly scapose; all the leaves, except those near the base, much reduced, bract-like.	
Ovary glabrous.	
Bracts prominently exserted from the inflorescence	1. *P. bracteosa*.
Bracts concealed by the inflorescence .	2. *P. Mannii*.
Ovary with scattered long hairs . . .	3. *P. Barteri*.
Stems elongate, with long nodes, the upper leaves fully developed, appearing opposite or whorled.	
Inflorescence dense; pedicels hardly $\frac{1}{5}$ in. long.	
Stems stout; leaves 3–8 in. wide . .	4. *P. Schweinfurthii*.
Stems weak; leaves 1–3 in. wide . .	5. *P. preussiana*.
Inflorescence loose; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. long .	6. *P. laxiflora*.
Pedicels articulated at the base, many early falling off. (Stems elongate with apparently-whorled leaves.)	
Inflorescence 2–6 in. long, 50–150-flowered .	7. *P. ambigua*.
Inflorescence 1 in. long; buds minute . .	8. *P. micrantha*.

**Distichos.—Seeds 5–8 in each cell, in two vertical rows or irregularly disposed. (Pedicels in all very short, articulated, many of the lower caducous, so that the peduncle appears covered with knots below the small cyme.)

Peduncles $\frac{1}{2}$–1 in. long	9. *P. thyrsiflora*.
Peduncles 0–$\frac{1}{16}$ in. long	10. *P. prionostachys*.

1. **P. bracteosa,** *C. B. Clarke in DC. Monogr. Phan.* iii. 133. Young parts shaggy with fulvous or greyish hair. Stems 1–8 in. long, with leaves only near the base. Leaves 12–18 by 3–4$\frac{1}{2}$ in., elliptic-lanceolate or somewhat obovate, acuminate at either end, when mature often nearly glabrate (even on the midrib beneath), except at the densely hairy margins. Stems $\frac{1}{6}$–$\frac{1}{3}$ in. in diam.; upper leaves few, 1–2$\frac{1}{2}$ in. long, lanceolate, bract-like, not sheathing. Inflorescence 1–3$\frac{1}{2}$ by $\frac{3}{4}$–1$\frac{1}{2}$ in., most dense, with 50–300 flowers; bracts in the upper part of the panicle $\frac{1}{2}$–$\frac{3}{4}$ in. long, broadly lanceolate, shaggy, exserted from the panicle; pedicels 0–$\frac{1}{2}$ in. long, persistent. Ovary glabrous, the dorsal cell as a rule 1-ovuled. Berry $\frac{1}{3}$ in. long, ellipsoid, apiculate, bright scarlet, 5-seeded. Seeds trapezoid, nearly smooth, not greatly flattened.—Durand & Schinz, Consp. Fl. Afr. v. 422; Hua in Bull. Soc. Bot. France xli. p. liv.

Upper Guinea. Sierra Leone: Samu Country, *Scott-Elliot*, 5933! Liberia, *cultivated specimen!* Cameroons: Efulen, *Bates*, 446!

Lower Guinea. Isle of St. Thomas; 3000–4500 ft., *Moller in Fl. Afr. Exsicc. Conimbric.*, 111!

The peduncles are all simple; in Moller n. 111 there are three from one root. The petiole, as in other species of *Palisota*, is very variable—1–6 in. long.

2. **P. Mannii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 132. Young parts shaggy with fulvous or greyish hair. Stems 1–9 in. long, with leaves only near the base. Leaves 12–18 by $2\frac{1}{2}$–$4\frac{1}{2}$ in., lanceolate or lanceolate-obovate, acuminate at either end, when mature often nearly glabrate except at the densely hairy margins. Stems $\frac{1}{6}$–$\frac{1}{4}$ in. in diam.; upper leaves few, up to $3\frac{1}{2}$ in. long, broadly lanceolate, not sheathing. Inflorescence 4–7 by 1–$1\frac{1}{2}$ in., oblong, most dense, with several hundred flowers; bracts small, concealed by the flowers; pedicels 0–$\frac{1}{4}$ in. long, persistent. Ovary glabrous. Fruit not known.—Durand & Schinz, Consp. Fl. Afr. v. 422; Hua in Bull. Soc. Bot. France, xli. p. lv.

Upper Guinea. Fernando Po; 3000 ft., *Mann*, 2340! Cameroons: Cameroon Mountain, 2000–3000 ft., *Mann*, 2139! *Kalbreyer*, 163!

I described this in DC. Monogr. Phan. l.c. as "caulescent," and Mann has noted the herb as 2 ft. high, which probably refers to the larger leaves. The stem is as in *P. bracteosa*; the upper leaves are much reduced. The fruit being unknown, there may be more than one species included here. The material is of 2 forms, viz.—

α. *P. Mannii*, C. B. Clarke, type (*i.e.*, Mann, n. 2340). Leaf in the type specimen 20 in. long (exclusive of the long petiole), obovate, broadest very near the top, suddenly narrowed into a short lanceolate tip (not an in. long).

β. (*i.e.*, Mann, 2139.) Leaf 16 in. long, lanceolate, broadest rather below the middle, narrowed into an elongate triangular tip nearly 9 in. long, not acuminate. Kalbreyer, n. 163, is nearly the same.

3. **P. Barteri,** *Hook. f. in Bot. Mag. t* 5318. Young parts shaggy with fulvous or greyish hair. Stems 1–5 in. long, with leaves only near their base. Leaves up to 24 by $4\frac{1}{2}$ in., the blade (exclusive of the quasi-petiole 8 in. long) often 9–15 in. long, obovate-lanceolate, suddenly narrowed into a lanceolate tip 1 in. long, when mature often nearly glabrate except at the densely hairy margins. Leaves on the stem 1–2 in. long, lanceolate, bract-like, not sheathing. Inflorescence $1\frac{1}{2}$–2 by 1–$1\frac{1}{4}$ in., very dense, short-oblong or quadrate (but see note below on the cultivated plant) with 100–250 flowers; bracts small, concealed by the flowers; pedicels 0–$\frac{1}{3}$ in. long, persistent. Ovary with long simple hairs scattered all over. Fruit immature, 5-seeded.—C. B. Clarke in DC. Monogr. Phan. iii. 132; Durand & Schinz, Consp. Fl. Afr. v. 422; Schoenl. in Engl. & Prantl, Pflanzenfam. ii. iv. 62, fig. 31, A—E; Hua in Bull. Soc. Bot. France, xli. p. liv.; Cornu in Bull. Soc. Bot. France, xliii. 28. *P. ombrophila*, K. Schum. (MS. ?) in Zenker, Exsicc. 1164.

Upper Guinea. Fernando Po; *Barter! Mann*, 94! Cameroons: Bipinde, *Zenker*, 1164!

The plant, in continued cultivation at Kew, has developed a narrow-oblong inflorescence, $4\frac{1}{2}$ in. long, looser than in the wild collections. The *P. ombrophila*, K. Schum., has the ovary fully as hairy as in the picture in the Botanical Magazine, and must be conspecific with *P. Barteri*.

4. **P. Schweinfurthii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 132 *partly*. Young parts shaggy with fulvous or greyish hair. Stem 3–7 ft. long, $\frac{1}{2}$ in. in diam., with internodes 2–4 in. long (or more) and 2 or 3 leaves apparently whorled at the node. Leaves up to 26 by 8 in., and

leaves on the stem seen 14 by 5½ in., elliptic, shortly acuminate at either end, more or less glabrate, but densely hairy on the margin. Inflorescence 4–7 by 1–1½ in., exceedingly dense, cylindric, with several hundred flowers; sometimes 2 or 3 peduncles together; bracts on the main rhachis small, concealed by the flowers; pedicels hardly ⅕ in. long, persistent. Ovary glabrous. Fruits ⅕ in. in diam., succulent, scarlet, 5-seeded. Seeds subpyramidal, nearly smooth.—Durand & Schinz, Consp. Fl. Afr. v. 422; Durand & Wild. in Bull. Soc. Bot. Belg. xxxvii. 128; Hua in Bull. Mus. Hist. Nat. Par. i. 118, and in Bull. Soc. Bot. France, xli. p. lv.; Rendle in Cat. Afr. Pl. Welw. ii. 74, excluding the St. Thomas' island plant.

North Central. French Congo: Kemo, *Dybowsky !*

Nile Land. British East Africa: Niamniam; Boddo River, *Schweinfurth*, 3054! Nabambisso River, *Schweinfurth*, 3697! Uganda; Kalungi, in woods, *Scott-Elliot*, 7364!

Lower Guinea. Gaboon, *Buettner*. 163! Lower Congo: Bingila, *Dupuis !* Mouth of the Congo, *Smith !* Angola: Golungo Alto; Quilombo-Quiacatubia, 1000–2400 ft., *Welwitsch*, 6599! 6603B! Pungo Andongo; in shady valleys between the higher rocks, 2400–3800 ft., *Welwitsch*, 6603!

South Central. Congo Free State: Monbuttu; Yuru River, *Schweinfurth*, 3279! 3281! Mbula River, north of the Kibali River, *Schweinfurth*, 3721! Kassai River, Lulua River, and Sankuru River, *Laurent !*

5. **P. preussiana,** *K. Schum.* (*MS.* ?), *in Preuss, Exsicc.* 996. Young parts shaggy with greyish hair. Stem 3 ft. long, ⅙ in. in diam., with long internodes and distant falsely-opposite leaves. Leaves 10 by 3 in., oblong, acuminate at either end, very glabrate except at the densely fulvous hairy margins; uppermost pair close to the inflorescence hardly smaller than the basal leaves. Inflorescence 3½ by 1 in., cylindric, very dense with 200–300 flowers; bracts concealed by the flowers; pedicels hardly ⅙ in. long, persistent. Ovary glabrous. Fruit not seen.

Upper Guinea. Cameroons: Buea, *Preuss*, 996!

6. **P. laxiflora,** *C. B. Clarke.* Young parts shaggy with fulvous or greyish hair. Stems up to 4–6 ft. high (*Welwitsch*), with fully developed leaves, pseudo-opposite or ternate at distant nodes. Leaves 12–18 by 3½ in., narrowly lanceolate-obovate, acuminate at both ends, when mature nearly glabrate except at the densely fulvous-hairy margins. Inflorescence in fruit 4 by 3 in., loose, 200-flowered; bracts on the main axis few, ½–¾ in. long, lanceolate; pedicels persistent, of the fruits ¼–⅓ in. long. Flowers white (*Welwitsch*). Ovary glabrous. Fruits succulent, ¼ in. in diam., scarlet (*Welwitsch*), subglobose, 5-seeded. Seeds trapezoid, somewhat flattened, nearly smooth.—*P. Schweinfurthii,* C. B. Clarke in DC. Monogr. Phan. iii. 132 partly; Rendle in Cat. Afr. Pl. Welw. ii. 74 partly.

Lower Guinea. Isle of St. Thomas, 3000–4300 ft., *Moller*, 11! in the woods of Fazenda de Monte Caffè, 2000 ft., *Welwitsch*, 6602!

7. **P. ambigua,** *C. B. Clarke in DC. Monogr. Phan.* iii. 130, *t.* 5, *fig.* 3. Young parts shaggy with fulvous hair. Stem 1–2 ft. long, with long internodes. Upper leaves apparently 3–5 in a whorl, 8 by 2 in., obovate-lanceolate, when mature nearly glabrate except at the densely fulvous-hairy margins. Peduncle 1–6 in. long; inflorescence 2–6 by $\frac{1}{2}$–$\frac{3}{4}$ in., loose, sparingly hairy, 50–150-flowered; bracts hardly $\frac{1}{4}$ in. long; pedicels 0–$\frac{1}{12}$ in. long, articulated at the base; buds $\frac{1}{12}$–$\frac{1}{10}$ in. in diam., puberulous, many soon falling. Ovary glabrous. Fruit ellipsoid, $\frac{1}{4}$ by $\frac{1}{6}$ in., with 2 (rarely 3) seeds in each anticous cell, 1-seed in the posticous cell. Seeds superposed, of a metallic blue colour, smooth, the top and bottom seeds pyramidal, the intermediate short cylindric. —Durand & Schinz, Consp. Fl. Afr. v. 421; Schoenl. in Engl. & Prantl, Pflanzenfam. ii. iv. 62, fig. 31, F—H; Durand & Schinz, Études Fl. Congo, i. 268; Durand & Wild. in Bull. Soc. Bot. Belg. xxxvi. 87, xxxvii. 127; Hua in Bull. Soc. Bot. France, xli. p. lv., and in Bull. Mus. Hist. Nat. Par. i. 119. *Commelina ambigua*, Beauv. Fl. Owar. i. 26, t. 15.

Upper Guinea. Lagos! Musin, *Millen*, 201! Niger Territory: Old Calabar, *Robb!* Cameroons: Rio del Rey, *Johnston*, 1!

Lower Guinea. Gaboon: Sierra del Crystal, *Mann!* River Gaboon, *Mann!* 1031! *Buettner*, 506! Lower Congo: Bingila, *Dupuis!* Mouth of the Congo, *Smith*, 63! French Congo: Kakomocka, *Lecomte*.

South Central. Congo Free State: Lunda; Mukenje, *Pogge!*

8. **P. micrantha,** *K. Schum.* (*MS.* ?) *in Zenker n.* 956. Inflorescence 1 by $\frac{1}{4}$ in. Buds scarcely $\frac{1}{20}$ in. in diam. Otherwise as *P. ambigua*.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 956!

The buds are less than half the size of those of *P. ambigua* at the same stage of development; still it may be doubted if this is other than a small state of that species. The stem and leaves are exactly the same as in it.

9. **P. thyrsiflora,** *Benth. in Hook. Niger Fl.* 544, *excl. syn.* Young parts shaggy with fulvous or grey hairs. Stems 3–15 ft. long. Upper leaves apparently opposite or whorled at the distant nodes, attaining 15 by 4 in., lanceolate-obovate or oblong-elliptic, shortly acuminate at the tip, long-cuneate at the base, margins persistently and densely hairy, midrib in the mature leaves hairy or glabrous beneath. Panicles often 10 by 2 in., loose, not rarely 2–4 from the uppermost whorl of leaves; bracts $\frac{1}{4}$–$\frac{1}{3}$ in. long, lanceolate. Peduncles of the cymes, mostly simple, often $\frac{1}{2}$–1 in. long, slender, with a number of adjacent knots at the top, which are the scars whence the pedicels have early fallen; pedicels 0–$\frac{1}{10}$ in. long. Corolla white. Stamens of the genus. Ovary glabrous. Berry $\frac{1}{4}$ in. in diam. or rather more, subglobose or ellipsoid, erect on the arm of the panicle, obtuse, blue, with often 10–16 seeds. Seeds trapezoid, not much flattened, nearly smooth. —C. B. Clarke in DC. Monogr. Phan. iii. 133, t. 5, fig. 4; Durand & Schinz, Consp. Fl. Afr. v. 422; Hua in Bull. Mus. Hist. Nat. Par. i. 118, and in Bull. Soc. Bot. France, xli. p. lv. *P. Thollonі*, Hua in Bull. Soc.

Bot. France, xli. pp. li. and lv., and in Bull. Mus. Hist. Nat. Par. i. 118. *P. plagiocarpa*, Hua in Bull. Soc. Bot. France, xli. pp. lii. and lv. *P. hirsuta*, K. Schum. (*MS.* ?) in Zenker & Staudt, Exsicc. 638. *P. Maclaudi*, Cornu in Bull. Soc. Bot. France, xliii. 30. *P. prionostachys*, Cummins in Kew Bulletin, 1898, 80, not of C. B. Clarke. *Dracæna hirsuta*, Thunb. Dissert. de Drac. 6. *D.? triandra*, Schultes, Syst. vii. 354. *Dianella triandra*, Afzel. Stirp. Guin. Med. Sp. Nov. 6.

Upper Guinea. Senegambia, *Heudelot*, 845! Sierra Leone: Ndomi, Samu Country and as far as Bumban, *Scott-Elliot*, 4234! and without precise locality, *Afzelius!* Liberia: Grand Bassa, *Vogel*, 64! Cape Palmas, *Vogel!* Gold Coast, *Burton & Cameron!* Ashanti: Assin-Yan-Kumassi, *Cummins*, 2! 130! 204! Lagos, *Maloney*, 8! Lower Niger: Aboh, *Barter*, 293! Old Calabar; *Mann*, 2339! Adinbo, *Holland*, 93! Cameroons: Efulen, *Bates*, 239! *Preuss*, 1133! Yaunde, 2700 ft., *Zenker & Staudt*, 638! 354! Victoria, *Kalbreyer*, 13! Fernando Po, *Barter*, 293! *Vogel*, 77! *Mann*, 95! *Barter!*

Lower Guinea. French Gaboon: *du Bellay;* French Congo: Brazzaville, *Brazza, Thollon*, 537, *Lecomte.* Lower Congo: Vivi, *Johnston!*

The new species of Hua have not been seen; but they are stated to be founded solely on the bairiness of the midrib of the under surface of the leaves, and on the degree of curvature and divarication of the cells of the anther of the intermediate stamen. The large series of *I. thyrsiflora* in Kew shows that these characters cannot be employed to found species upon.

10. **P. prionostachys,** *C. B. Clarke in DC. Monogr. Phan.* iii. 134. Primary branches of panicle 0–$\frac{1}{10}$ in. long, thick, oblique, erect, each surmounted by a thick rugged cyme-base $\frac{1}{3}$–$\frac{1}{2}$ in. long (numerous lower pedicels having early fallen), the cyme-tip recurved; otherwise as *P. thyrsiflora.*—Durand & Schinz, Consp. Fl. Afr. v. 422, not of Hua. *P. congolana*, Hua in Bull. Soc. Bot. France, xli. pp. lii. and lv.

Upper Guinea. Niger Territory: Old Calabar, *Robb!*

Lower Guinea. French Congo, Brazzaville, *Dybowski;* Kakomocka, *Lecomte.*

South Central. Congo Free State: Monbuttu, *Schweinfurth*, 3622!

The localities in Lower Guinea hang on the correct reduction of *P. congolana*, Hua, which has not been seen.

It appears from an observation of Hua that his *P. prionostachys* had a hairy ovary, and was therefore not the present species which has the ovary quite glabrous as in *P. thyrsiflora*, to which it is very closely allied.

Imperfectly known species.

11. **P. bicolor,** *Masters in Gard. Chron.* 1878, ix. 527; C. B. Clarke in DC. Monogr. Phan. iii. 134; Durand & Schinz, Consp. Fl. Afr. v. 422; Hua in Bull. Soc. Bot. France, xli. p. lv.

Upper Guinea. Fernando Po.

Originally described from a cultivated plant. This appears to have been one of the hemiscapose group; the leaves only are described by Masters; and his description may do for any one of the first 3 species above.

3. COMMELINA. Linn.; Benth. et Hook. f. Gen. Pl. iii. 847.

Inflorescence of 2(–1) cymes included (or partly included) within a folded or funnel-shaped spathe. Sepals 3, concave, obtuse. Petals 3, whereof 2 are long-clawed, the third dorsal and shorter. Stamens 3–2 anterior perfect, 3–2 dorsal sterile with rudiments of the anthers. Ovary cells 2 anterior equal, 2–1 ovuled, dehiscent in fruit, the third dorsal 1-ovuled or empty or suppressed. Seeds 5–1 to the capsule; hilum linear, vertical.—Succulent weeds. Flowers fugitive, blue, white or yellow. The spathe is an ovate leaf-like bract, either simply folded flat with an acute (often curved) midrib (keel), or with the lower margin connate so as to form an oblique funnel. The lower cyme in each spathe has often only male flowers, and is early caducous by an articulation or not rarely wanting; the upper cyme has usually perfect flowers at the base, male at the top.

Species 120, in all warm countries.

The subgenus *Didymoon* below is well separated from *Monoon*—i.e., I know no case of the assigned character failing. The sectional groups pass, however, into each other. In *Eu-Commelina* the dorsal cell of the capsule is frequently sterile or nearly wanting; while in *Dissecocarpus* there is frequently present a rudimentary dorsal cell which, in a few instances, has contained a small seed. So also, in *Heterocarpus*, though the 4 ovules of the 2 anterior cells nearly always fail to perfect seeds, in a few species the two upper ovules of these cells do produce seeds at least occasionally. The line between the sections *Trithyrocarpus* and *Spathodithyros* is (as Hua has shown) by no means absolute. The sections, nevertheless, appear to me to form fairly natural groups. In the description of the spathe it is supposed to be unfolded and viewed as a leaf flattened out.

*DIDYMOON.—Ovules 2 in each ventral cell of the ovary, 1 or 0 in the dorsal cell.

†*Eu-Commelina.*—Capsule 3-celled, 2-valved; the dorsal valve deciduous with the included seed, but usually finally dehiscing. Seeds normally 5 to the capsule.

‡Spathe simply folded, the margins being free or only slightly connate at the very base.

§Seeds reticulated; the margins of the subhexagonal cells raised and forming a continuous line round the depressed areoles; corolla blue.

Leaves elliptic to lanceolate.

Leaves scattered; spathes mostly peduncled . 1. *C. nudiflora.*

Leaves close-packed; spathes as though sessile on the leaf-sheaths . . . . 2. *C. Sabatieri.*

Leaves linear.

Stems 5–10 ft. long; seeds of the ventral cells $\frac{1}{8}$ in. long . . . . . 3. *C. scandens.*

Stems 1–2 ft. long; seeds of the ventral cells less than $\frac{1}{16}$ in. long . . . . 4. *C. Gambiæ.*

§§Seeds pitted, obscurely tubercled or wrinkled.

Fertile stems hemiscapose, with 2 or 3 leafless sheaths . . . . . 5. *C. scaposa.*

Fertile stems leafy.

Leaves linear.

Roots fibrous; short-lived annuals.

Leaves 2–3 in. long . . . . 6. *C. subulata.*

Leaves up to 6–9 in. long.

Seeds ovoid or ellipsoid.
Spathes shaggy with multicellular hairs . . . . . 7. *C. angustissima.*
Spathes glabrous, with ciliate margins . . . . . 9. *C. violacea.*
Seeds nearly flat, 3-lobed . . . 8. *C. trilobosperma.*
Roots thick; stems thicker, hardened at the base.
Spathes $\frac{1}{2}$ in. long; leaves narrowly linear.
Spathes shaggy, with a nearly straight tip . . . . . 10. *C. purpurea.*
Spathes glabrate, with a deflexed tip . 11. *C. nyasensis.*
Spathes $1\frac{1}{2}$ in. long; leaves long linear-lanceolate . . . . . 12. *C. cœlestis.*
Leaves ovate . . . . . 13. *C. crassicaulis.*
§§§Seeds smooth . . . . . 14. *C. Schweinfurthii.*

††Spathe having its margins connate near the base, so that the spathe is hooded or obliquely funnel-shaped. (See also 14. *C. Schweinfurthii.*)
Peduncle of spathe hardly longer than the leaf-sheath.
Leaves triangular at the tip, not very acute.
Spathes obliquely funnel-shaped . . 15. *C. benghalensis.*
Spathes with the keel much curved . . 16. *C. uncata.*
Leaves acuminate to an acute tip.
Leaves lanceolate, glabrate . . . 17. *C. congesta.*
Leaves elliptic-lanceolate, hairy . . . 18. *C. condensata.*
Peduncle of the spathe much longer than the leaf-sheath.
Spathe hirsute; seeds subglobose, smooth . . 19. *C. zambesica.*
Spathe glabrous; seeds elongate, transversely wrinkled . . . . . 20. *C. boissieriana.*

††*Heterocarpus.*—Capsule 3-celled, 2-valved; the dorsal valve deciduous with the included seed, indehiscent, the seed very intimately attached to the pericarp. Ventral cells with 2 ovules in each cell; both usually withering (without producing a fertile seed); in a few species the capsule is frequently 3-seeded.
Margins of spathe connate at the base; capsule often 3-seeded; corolla blue . . . . . 21. *C. Forskalæi.*
Spathe simply folded, the margins free at the base; corolla yellow.
Leaves small, at most $1\frac{1}{4}$ in. long . . . 30. *C. Mannii.*
Leaves, or many of them, $1\frac{1}{2}$ in. long or more.
Leaves linear or linear-lanceolate.
Leaves nearly glabrous; seeds $\frac{1}{12}$ in. long . 28. *C. Kirkii.*
Leaves puberulous; seeds $\frac{1}{8}$ in. long . . 29. *C. boehmiana.*
Leaves lanceolate or broader (elliptic or ovate).
Mature leaves nearly glabrous.
Spathes 1–2 in. long, acuminate . . 22. *C. africana.*
Spathes $\frac{3}{4}$ in. long, shortly acute . . 23. *C. edulis.*
Spathes up to 3 in. long, elongate-acuminate . 27. *C. Buchanani.*
Mature leaves pubescent.
Leaves lanceolate.
Spathes 1–2 in. long . . . . 25. *C. krebsiana.*
Spathes up to $2\frac{1}{2}$ in. long . . . 24. *C. involucrosa.*
Leaves ovate, subcordate at the base . . 26. *C. cordifolia.*

†††*Dissecocarpus.*—Capsule normally perfecting 4 seeds, in the two ventral cells; the dorsal cell quite rudimentary or absent, only by accident perfecting a seed. Capsule quadrate or oblong, usually constricted between the seeds which are prominent as 4 knobs or elevations from without.

‡Spathes scattered.

Seeds smooth or wrinkled or pitted.

Capsule longer than broad; seeds cylindric-ellipsoid.

Spathe ovate, very broad at the base.

Spathes $\frac{1}{3}$—$\frac{2}{3}$ in. long . . . . 31. *C. Kotschyi.*

Spathes 1 in. long or more . . . 32. *C. imberbis.*

Spathe elliptic-acuminate . . . . 33. *C. Petersii.*

Capsule nearly square; seeds globose.

Leaves oblong to ovate.

Mature leaves glabrous or very nearly so.

Upper leaves rounded, eared or sagittate at the base . . . . . 34. *C. latifolia.*

Upper leaves cuneate at the base, quasi-petioled . . . . . 35. *C. cuneata.*

Mature leaves hairy on both surfaces.

Spathes $\frac{3}{4}$ in. long, striate . . . 36. *C. spectabilis.*

Spathes 1 in. long, not striate, brown-purple . . . . . 37. *C. Cecilæ.*

Leaves linear or linear-lanceolate, often dilated at the very base.

Margins of the spathe free at the base.

Spathes $\frac{1}{2}$—$\frac{2}{3}$ in. long.

Whole plant hairy . . . . 38. *C. demissa.*

Nearly glabrous . . . . 39. *C. madagascarica.*

Spathes 1 in. long or more.

Plant nearly stemless . . . 40. *C. huillensis.*

Plant with a leafy stem.

Scabrous or glabrate; seeds small, globose . . . . . 41. *C. Carsoni.*

Shaggy; seeds ellipsoid, rather large . 42. *C. Welwitschii.*

Margins of the spathe united at the base (very shortly so in *C. subcucullata*).

Spathes very shortly united at the margin 43. *C. subcucullata.*

Spathes united at the margin for $\frac{1}{4}$—$\frac{1}{2}$ in. . 44. *C. neurophylla.*

Seeds echinate . . . . . 45. *C. echinosperma.*

‡‡Spathes approximated at the ends of the branches, apparently in heads.

Leaves sessile, oblique, unequal at the base.

Flowers yellow (or white): seeds large, cylindric 46. *C. capitata.*

Flowers blue; seeds small, subglobose . . 47. *C. rufociliata.*

Leaves with a long quasi-petiole . . . . 48. *C. longicapsa.*

**Monoon.—Ovules 1 in each ventral cell of the ovary, 1 or 0 in the dorsal cell.

†*Trithyrocarpus.*—Capsule with 3 similar 1-ovuled dehiscent cells, thin and papery when ripe. The third dorsal cell is frequently smaller and sometimes barren or wanting.

Spathes solitary, none in clusters.

Leaves linear . . . . . 49. *C. umbellata.*

Leaves elliptic . . . . . 50. *C. bracteosa.*

Leaves lanceolate . . . . . 51. *C. guineensis.*

Spathes (or most of them) approximated in clusters.

Leaves linear.

Seeds $\frac{1}{10}$ in. long, smooth	52. *C. aspera.*
Seeds $\frac{1}{6}$ in. long, transversely wrinkled	53. *C. mensensis.*
Leaves oblong or elliptic-lanceolate.	
Mature leaves hairy on both surfaces	54. *C. firma.*
Mature leaves nearly glabrate	55. *C. Vogelii.*

††*Heteropyxis.*—Capsule of 3 1-seeded cells, 2-valved; the dorsal cell indehiscent and tough, often rough.

Spathes all scattered, peduncled.	
Leaves narrowly oblong	56. *C. Bainesii.*
Leaves broadly elliptic	57. *C. lagosensis.*
Spathes several together at the ends of the branches.	
Petals $\frac{1}{4}$–$\frac{1}{3}$ in. broad.	
Leaves narrowed at the base; spathes 2–4 on a branch.	
Spathes hooked; seeds large ellipsoid	58. *C. albescens.*
Spathes slightly curved; seeds small globose	59. *C. sphaerosperma.*
Leaves not narrowed at the base; spathes 10–20 on a branch	60. *C. opulens.*
Petals $\frac{3}{4}$ in. broad	61. *C. venusta.*

†††*Spathodithyros.*—Ovary 2-celled; cells 1-ovuled; capsule 2-valved, 2-seeded.

Leaves linear	62. *C. Livingstoni.*
Leaves elliptic or oblong.	
Seeds ellipsoid; leaves ovate at the base	63. *C. Zenkeri.*
Seeds globose; leaves narrowed at the base.	
Leaves 2–4 in. long, oblong	64. *C. æthiopica.*
Leaves up to $4\frac{1}{2}$ in. long, elliptic	65. *C. pyrrhoblepharis.*
Leaves 1 to $1\frac{1}{4}$ in. long	66. *C. obscura.*

1. **C. nudiflora,** *Linn. Sp. Pl. ed.* i. 41, *ed.* ii. 61, *not of Linn. Mant.* Hairy or glabrate. Stems 1–2 ft. long, diffuse, decumbent at the base, often rooting at the nodes; roots fibrous, not thick. Leaves 1–$2\frac{1}{2}$ by $\frac{1}{3}$–$\frac{2}{3}$ in., lanceolate, narrowed at the base, the quasi-petiole very short. Spathes scattered on peduncles $\frac{1}{2}$–2 in. long, simply folded (the lower margins of the leaf free or hardly connate), ovate-lanceolate. Racemes in each spathe usually 2, the lower 1–3-flowered and rarely maturing a capsule, the upper with 3–8 flowers usually maturing 3–1 capsules. Petals blue or nearly white, ovary with 2 ovules in each of the two anterior cells. Capsule normally 5-seeded, the dorsal 1-seeded cell dehiscing later or not at all. Seeds black, reticulated, the hexagonal areoles depressed, farinose—C. B. Clarke in DC. Monogr. Phan. iii. 144 incl. var. β *werneana*, and in Dyer, Fl. Cap. vii. 8; Schoenl. in Engl. & Prantl, Pflanzenfam. ii. iv. 64; Durand & Schinz, Conspect. Fl. Afr. v. 427, and Études Fl. Congo i. 269; Hook. f. Fl. Brit. Ind. vi. 369; Durand & Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 87, and in Bull. Soc. bot. Belg. xxxvii. 128; K. Schum. in Engl. Pfl. Ost-Afr. C. 134; Hua in Bull. Mus. Hist. Nat. Par. i. 119; Rendle in Cat. Afr. Pl. Welw. ii. 74. *C. agraria*, Kunth, Enum. iv. 38; Webb & Berth. Iles Canaries, Phyt. iii. 356, t. 238; Benth. in Hook. Niger Fl. 541. *C. communis*, Walter, Fl. Carol. 68; Kunth, Enum. iv. 36 excl. syn.; C. B. Clarke, Commel. et Cyrt. Beng. t. 1 excl. syn. *C. africana*; Benth. in Hook Niger. Fl. 541, cf. note. *C. werneana*, Hassk. in Schweinf.

Beitr. Fl. Aethiop. 206, 295. *C. barbata*? Rendle in Cat. Afr. Pl. Welw. ii. 76, not of Lam.—Pluk. Phytogr. t. 27, fig. 4, not Alm. p. 135.

Nile Land. British East Africa: White Nile, *Petherick!* *D'Arnaud!* Niamniam, *Schweinfurth*, 3739! 3797!

Upper Guinea. Sierra Leone; Sugarloaf Mountain, *Welwitsch*, 6625! 6625B! and without precise locality, *Don*, 2! *Vogel*, 11! *Scott-Elliot*, 3875! *Hart!* Niger Territory: Opobo, *Holland*, 140! Old Calabar, *Holland*, 75! *Robb!* Cameroons: Cameroon Mountain, *Mann*, 2137! Batanga, *Bates*, 18! Efulen, *Bates*, 268! and without precise locality, *Preuss*, 1320! Fernando Po, *Vogel*, 67!

Lower Guinea. Island of St. Thomas, *Moller*, 9A! *Quintas*, 9! *Don*, 1! *Fl. Afr. Exsic. Herb. Conimbric.* 112! Gaboon: Munda; Sibange Farm, *Soyaux*, 378! French Congo: Bramaya, *Paroisse*, 209; Nyanga River, *Dybowski*, 14; Brazzaville, *Dybowski*; Njobe, *Schwebisch and Thollon.* Loango, *Soyaux*, 16! Congo Free State: Lower Congo; Bingila, *Dupuis!* Kisantu, *Gillet!* Lukungu, 1000–2000 ft., *Hens*, ser. A, 247! and without precise locality, *Smith!* Boma, *Monteiro!* Angola: north of Ambriz, *Welwitsch*, 6612! between Ambriz and Mosul, *Welwitsch*, 6623! by the River Bengo, near San Antonio, *Welwitsch*, 6617! by the larger lake of Quilunda, near Prata, *Welwitsch*, 6619! Golungo Alto; near Canguerasange and Zengas do Queta, *Welwitsch*, 6609! by the River Quiapoze, and at Varzea d'Isidre, *Welwitsch*, 6608! Sange, *Welwitsch*, 6606! Mossamedes; by the River Bero, *Welwitsch*, 6580! by the River Cuanza, *Johnston!*

South Central. Congo Free State: Mpala, on Lake Tanganyika, *De Beerst!*

Mozamb. Dist. Portuguese East Africa: Lower Zambesi, Expedition Island, *Kirk!* British Central Africa: Nyasaland; Mount Sochi, *Scott-Elliot*, 8652! Kondowe to Karonga, 2000–6000 ft., *Whyte!*

In the tropical and warm temperate regions of the world—a weed.

The typical *C. nudiflora* is a weak rambling plant with distant long-lanceolate leaves and acuminate spathes. *C. agraria*, Kunth, is a shorter, neater plant with shorter (almost ovate) shortly acute leaves, and short spathes. *C. werneana*, Hassk., is a robust state with leaves up to $3\frac{1}{2}$ in. long, and long spathes. The Lower Guinea form, referred doubtfully by Rendle to *C. barbata*, may be a distinct species; it has the mature leaves densely hairy on both surfaces, the stem nearly concealed by the approximate hairy leaf-sheaths; but it has the capsule and seeds exactly of *C. nudiflora*, and must be closely allied to it.

2. **C. Sabatieri**, *C. B. Clarke in DC. Monogr. Phan.* iii. 146. Nearly glabrous. Root fibrous. Stems decumbent, nearly concealed by the leaf-sheaths. Leaves 1 by $\frac{1}{3}$–$\frac{1}{2}$ in., elliptic-oblong, scarcely acute, margins wavy, whitened, subsessile; leaf-sheaths scarious, inflated, slightly hairy at the mouth. Spathes rather more than $\frac{1}{2}$ in. long, simply folded, ovate, acute, nearly sessile, i.e., the peduncle hardly exserted from the leaf-sheath. Capsule and seeds as of *C. nudiflora*.—Durand & Schinz, Conspect. Fl. Afr. v. 427.

Nile Land. British East Africa: Sources of the White Nile, *Sabatier!*

3. **C. scandens,** *Welw. ex C. B. Clarke in DC. Monogr. Phan.* iii. 146. Robust, nearly glabrous. Stems 5–10 ft. long, little divided, with internodes 3–4 in. long. Leaves $4\frac{1}{2}$ by $\frac{1}{3}$ in., linear. Peduncles exserted $\frac{2}{3}$–1 in., often from the lower leaf-sheaths. Spathes 1–$2\frac{1}{2}$ in. long, simply folded, ovate-lanceolate, long attenuate, rounded at the base. Petals deep blue. Capsule nearly $\frac{1}{3}$ in. long; seeds more than $\frac{1}{8}$ in.

long, cylindric-ellipsoid, reticulated.—Durand & Schinz, Conspect. Fl. Afr. v. 428; Rendle in Cat. Afr. Pl. Welw. ii. 75.

Lower Guinea. Angola: Pungo Andongo; 3300 ft., on the banks of the River Cuanza, near Nbilla, *Welwitsch*, 6642.

Mozamb. Dist. Lake Tanganyika, *Cameron!*

Also from Madagascar.

This almost surely belongs to the present group. There were 4 seeds in the two ventral cells; the dorsal cell in the one capsule preserved is empty, as happens occasionally.

4. **C. Gambiæ,** *C. B. Clarke in DC. Monogr. Phan.* iii. 146. Thinly villous. Stems 20 in. long, much divided; base decumbent, rooting at the nodes; roots fibrous. Leaves 2–3 by $\frac{1}{4}$ in., linear. Spathes on peduncles exserted 0–$\frac{1}{2}$ in., numerous, solitary, $\frac{2}{3}$ in. long, simply folded, ovate, shortly acuminate, rounded or rhomboid at the base. Flowers small, deep blue. Capsule usually 5-seeded; seeds of the ventral cells scarcely $\frac{1}{12}$ in. long, subglobose, strongly reticulated, the margins of the reticulations much raised, continuous.—Durand & Schinz, Conspect. Fl. Afr. v. 425.

Upper Guinea. Gambia, *Ingram!* Senegambia, *Heudelot*, 577!

This is the plant "indicated" by Bentham (in Hook. Niger Fl. 542) as *C. Forskalæi* from Senegambia. The leaves and spathes resemble fairly well those of *C. Forskalæi*, Vahl; but the capsules and seeds are totally unlike.

5. **C. scaposa,** *C. B. Clarke in Comptes-rendus Soc. bot. Bely.* xxxviii. 220. Nearly glabrous. Leaves on sterile stem not seen. Fertile stems 8–12 in. long, simple, leafless, with 2 or 3 distant leaf-sheaths; free point to the leaf-sheaths less than $\frac{1}{4}$ in. long. Spathes solitary, on peduncles up to $2\frac{1}{2}$ in. long, simply folded, the margins hardly united at the base, $\frac{1}{2}$–$\frac{2}{3}$ in. long, ovate, shortly acuminate. Seeds normally 5 to the capsule, those in the ventral cells slightly pitted and tubercular.

South Central. Congo Free State: Upper Marangu, *De Beerst!*

6. **C. subulata**, *Roth, Nov. Pl. Sp.* 23. A nearly glabrous annual. Stems 6–15 in. long, weak, divided. Leaves 2 by $\frac{1}{6}$–$\frac{1}{4}$ in., linear. Spathes scattered, solitary, on a peduncle hardly exserted from the leaf-sheath, $\frac{1}{2}$ in. long, ovate, shortly acute, simply folded, not striated by curved coloured parallel lines; inflorescence little exserted from the spathe. Petals small, blue (see note below). Capsule $\frac{1}{6}$–$\frac{1}{5}$ in. long, with normally 5 seeds. Seeds of the ventral cells (often strongly) wrinkled, as well as pitted subtuberculate.—C. B. Clarke in DC. Monogr. Phan. iii. 148, incl. var. β; Engl. Hochgebirgsfl. Trop. Afr. 154; Durand & Schinz, Conspect. Fl. Afr. v. 428; K. Schum in Engl. Pfl. Ost-Afr. C. 134; Rendle in Journ. Linn. Soc. xxx. 429; C. B. Clarke in Dyer, Fl. Cap. vii. 9. *C. striata*, Hochst. ex Kunth, Enum. iv. 44; Hassk. in Schweinf. Beitr. Fl. Aethiop. 207, 295. *C. subaurantiaca*, Hochst. ex Kunth, Enum. iv. 658; Hassk. in Schweinf. Beitr. Fl. Aethiop. 208, 295. *C. linearifolia*, Kunth, Enum. iv. 43.

Nile Land. Kordofan: Abu Gerad, *Kotschy*, 59! and without precise locality, *Kotschy*, 34! Eritrea: Bogos, *Hildebrandt*, 370! Keren, *Beccari*, 172; Habab,

6000 ft., *Hildebrandt*, 368! Gallabat: region of Matamma, *Schweinfurth*, 531! Abyssinia: near Adowa, *Schimper*, 360! 5900 ft., *Schimper*, 45; Lotho, *Schimper*, 419! and without precise locality, *Schimper*, 574! British East Africa: East Ongalea Mountains at Kinani, 2200 ft., *Gregory!*

Upper Guinea. Bornu, *Vogel*, 53!

Mozamb. Dist. Portuguese East Africa: Quilimane, *Scott!* British Central Africa: Nyasaland; Shire Highlands, *Buchanan!*

Also in South India, and Extratropical South Africa.

The flowers in *C. subulata*, Roth, and *C. striata*, Kunth, are always blue as far as known. The name *C. subaurantiaca*, Hochst., appears to have been given by Hochst. in the herbarium (not from any field note by the collector, Schimper); and Hasskarl suggests that it refers to the yellow colour of the dried plant, not to that of the flower, the colour of which is unknown in *C. subaurantiaca*.

Var. β *heterantha*, C. B. Clarke. Petals yellow.—*C. heterantha*, Welw. ex C. B. Clarke in DC. Monogr. Phan. iii. 148; Rendle in Cat. Afr. Pl. Welw. ii. 75.

Lower Guinea. Angola: Pungo Andongo; on sandy rocks of the Præsidium, *Welwitsch*, 6333 partly! meadows near Condo, *Welwitsch*, 6633B! Mossamedes, *Welwitsch*, 6587! Huilla, 3800–5500 ft.; on the banks of the River Ema, among crops, *Welwitsch*, 6588! near Lopollo, *Welwitsch*, 6589!

Welwitsch has carefully noted the colour of the flower in all these numbers—as "yellow," "light yellow," or "brownish-yellow." Except, however, in the colour of the flower, I can discover no difference between this plant and typical *C. subulata*, Roth.

7. **C. angustissima,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 134. Annual. Stems slender, 16 in. high. Leaves 7 by $\frac{1}{3}$ in., very narrowly linear. Spathes solitary, less than $\frac{1}{3}$ in. long, villous. Flowers deep blue; otherwise as *C. subulata*, Roth.

Mozamb. Dist. German East Africa: Usinja; Karumo district, *Stuhlmann*, 3564.

No example seen; but the three subjoined plants agree with the description in the long linear leaves, and small spathes shaggy with white multicellular hairs.

Lower Guinea. Angola: Pungo Andongo; on sandy rocks of the Præsidium, 2400–3800 ft., *Welwitsch*, 6633 partly!

Mozamb. Dist. German East Africa: Kesokwe, *Hannington!* in wet ground on the edges of streams at Tabora (Kaseh), 3960 ft., *Speke & Grant!*

8. **C. trilobosperma,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 134. Probably annual. Stems 1 ft. high, slender. Leaves up to 5 by $\frac{1}{3}$ in., elongate-lanceolate. Spathes less than $\frac{1}{3}$ in. long, glabrous. Flowers blue. Seeds trigonous, nearly flat, conspicuously 3-lobed. Very near *C. subulata*, Roth, but excellently separated by the 3-lobed seeds.

Mozamb. Dist. German East Africa: Usinja; Karumo district, *Stuhlmann*, 3566.

Not seen; the above abstracted from K. Schumann. The seeds described would separate the species excellently from any other species of *Commelina*; it is difficult to imagine how they would pack into the 5-seeded 3-celled capsule of the Sect. *Eu-Commelina*.

9. **C. violacea,** *C. B. Clarke.* A nearly glabrous erect annual growing in water. Stems 15 in. long, little divided, with long internodes. Leaves 9 by $\frac{1}{6}$ in. Spathes few, solitary, nearly $\frac{1}{2}$ in. long, on peduncles scarcely exserted from the leaf-sheath, ovate-lanceolate, glabrous with ciliate margins, slightly striated by curved purplish

veins. Flowers hardly exserted from the spathes, violet (*Schinz*). Capsule $\frac{1}{5}$ in. long, 5-seeded; seeds strongly tubercled, deeply wrinkled.

Lower Guinea. Amboland; in marshy places at Olukonda, *Schinz*, 21! 33!
The flowers are violet in the finely preserved specimens.

10. **C. purpurea,** *C. B. Clarke ex Rendle in Journ. Linn. Soc.* xxx. 429. Nearly glabrous, except the spathes. Stems 15 in. high, with long internodes; base erect, thickened, almost woody; roots 7 in. long, thick. Leaves 9 by $\frac{1}{5}$ in. Spathes few, scattered, on peduncles exserted 0–1 in., simply folded, $\frac{1}{2}$ in. long, ovate, acute with the tip nearly straight, some shaggy, some only slightly hairy, striated by chocolate-coloured parallel nerves. Racemes exserted from the spathes. Flowers chocolate-colour (*Speke & Grant*). Capsule 5-seeded; seeds moderately pitted.—*C. nigritana*, Baker in Trans. Linn. Soc. xxix. 163, not of Benth. *C. subulata*, C. B. Clarke in DC. Monogr. Phan. iii. 148 partly, not of Roth. *Commelina*, sp. n. 2, T. Thoms. in Speke, Nile, Append. 650.

Nile Land. British East Africa: between Ndoro and Guaso Thegu, *Gregory*.
Mozamb. Dist. German East Africa: Unyamwezi district, by water, 3600 ft., *Speke & Grant!*

In the dry examples, the spathes are very strongly striated by chocolate-coloured nerves, the petals are a deep purple. In the colours noted in the field of the flowers in this Order, a question often arises whether the petals, the anthers, or the spathes have caught the eye of the collector.

11. **C. nyasensis,** *C. B. Clarke.* Nearly glabrous. Stems 12–20 in. long, much divided, rather slender, with very long internodes up to 6–8 in. long; base of the stem (imperfectly preserved) appears similar to that of *C. purpurea.* Leaves 6 by $\frac{1}{6}$ in., narrowly linear. Spathes scattered on axillary branches, approximate, sometimes many in dense clusters, less than $\frac{1}{2}$ in. long, simply folded, broadly ovate, with a very short acute deflexed tip, striated by coloured veins (blue to chocolate in the dried plants), which are very prominent or nearly disappear in spathes on the same stem. Capsule 5-seeded; seeds moderately wrinkled or pitted.

Mozamb. Dist. British Central Africa: Nyasaland; Tanganyika Plateau, at Fort Hill, 3500–4000 ft., *Whyte!* Monganja Highlands, 4000 ft., *Kirk!*

12. **C. cœlestis,** *Willd. Enum. Hort. Berol.* i. 69. Minutely hairy. Stems 1–2 ft. high, erect at the base; roots thick, often clavate at the ends. Leaves 5 by $\frac{1}{3}$–$\frac{1}{2}$ in. Peduncles scattered, 1–$1\frac{1}{2}$ in. long. Spathes $1\frac{1}{2}$ in. long, ovate-lanceolate, simply folded, often purplish or striate. Flowers blue, much exserted from the spathe. Capsule 5-seeded; seeds deeply pitted.—C. B. Clarke in DC. Monogr. Phan. iii. 153; cfr. Hook. f. Fl. Brit. Ind. vi. 369.

Nile Land. British East Africa: Machakos, *Scott-Elliot*, 6387!
Mozamb. Dist. British Central Africa: Urungu; Fwambo, *Carson*, 35 between Lake Nyasa and Lake Tanganyika, 6000–8000 ft., *Thomson!*
Indigenous in Mexico.
This plant is disposed to establish itself in various parts of the world.

13. **C. crassicaulis,** *C. B. Clarke in DC. Monogr. Phan.* iii. 149. Nearly glabrous; margins of the leaves and spathes ciliate. Stem 6 in. long, erect from a bulb. Leaves 3 by $1\frac{1}{3}$ in., sessile, ovate-lanceolate, subcordate at the base. Peduncles 2 in. long, rigid. Spathes $1\frac{1}{3}$ in. long, simply folded, ovate-lanceolate, striated, cordate at the base. Capsule 5-seeded; seeds $\frac{1}{8}$–$\frac{1}{6}$ in. long, deeply wrinkled.—Durand & Schinz, Conspect. Fl. Afr. v. 425.

Lower Guinea. Angola: near Guingongue, *Herb. Paris.*

14. **C. Schweinfurthii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 158. Nearly glabrous, except the spathes. Stems 15 in. long, divided, with very long internodes, the base not well shown in the specimens, but similar to that of *C. purpurea*. Leaves up to 7 by $\frac{1}{3}$–$\frac{1}{2}$ in., elongate, linear-lanceolate. Peduncles $\frac{1}{2}$–2 in. long, scattered. Spathes $\frac{3}{4}$–1 in. long, very broadly ovate, shortly acuminate, not striate with coloured veins, shaggy or nearly glabrate; the two margins of the spathe shortly connate at the base. Capsule normally 5-seeded, but the ventral cells contain sometimes 1 seed only (the lower ovule having proved infertile); seeds subglobose, smooth.—Durand & Schinz, Conspect. Fl. Afr. v. 428; K. Schum. in Engl. Pfl. Ost-Afr. C. 134.

Upper Guinea. Sierra Leone: on a rocky hill, 3 miles south of Falaba, *Scott-Elliot,* 5164!

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth,* 2022!

Mozamb. Dist. German East Africa: Unyamwezi; Kakoma (ex *K. Schumann*).

15. **C. benghalensis,** *Linn. Sp. Pl. ed.* i. 41, *ed.* ii. 60, *excl. fig. Pluk. cited.* A diffuse, more or less hairy annual, rooting at the base, 1–$2\frac{1}{2}$ ft. long, much branched. Near the base are often present branches that grow underground, or stolons, on which reduced leaves and spathes, with apetalous often closed flowers, and abnormal usually 1–2-seeded capsules are formed plentifully—even where the perfect regular capsules are also present on the upper branches. Leaves 1–$3\frac{1}{2}$ in. long, ovate-elliptic, shortly triangular or subobtuse at the tip, suddenly narrowed at the base into a quasi-petiole. Spathes on peduncles hardly exserted from the leaf-sheaths, often a few near together near the tips of the branches, $\frac{1}{2}$–$\frac{2}{3}$ in. long and broad, obliquely funnel-shaped, i.e., the lower margins of the spathe connate for $\frac{1}{4}$–$\frac{1}{3}$ in. Petals blue. Capsule $\frac{1}{5}$ in. long, 5-seeded; seeds rough or wrinkled.—Forskh. Fl. Ægypt.-Arab. 12 partly; Kunth, Enum. iv. 50; Benth. in Hook. Niger Fl. 541; Hassk. Commel. Ind. 28, 29; Wight, Ic. t. 2065; C. B. Clarke, Commel. et Cyrt. Beng. t. 4, DC. Monogr. Phan. iii. 159, and in Dyer, Fl. Cap. vii. 9; Hook. f. Fl. Brit. Ind. vi. 370; Hassk. in Schweinf. Beitr. Fl. Aethiop. 209, 295, incl. var. *β longepetiolata*; Durand & Schinz, Conspect. Fl. Afr. 424; Durand & Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 87, and in Bull. Soc. bot. Belg. xxxvii. 128; K. Schum. in Engl. Pfl. Ost-Afr. C. 134; Rendle in Cat. Afr. Pl. Welw. ii. 76; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 53 (var. γ). *C. cucullata*, Linn. Mant. 176. *C. canescens*, Vahl, Enum. ii. 173; Webb & Berth. Iles Canaries, Phyt. iii. 358, t. 239. *C. procurrens*, Schlecht.

in Linnæa, xxiv. 656, xxv. 183; Hassk. in Schweinf. Beitr. Fl. Aethiop. 209, 295. *C. latifolia*, Hochst. in Schimper, Exsicc. 341, not of A. Rich. *C. rhizocarpa*, Afzel., *C. radiciflora*, R. Br. and *C. vivipara*, Ritchie ex C. B. Clarke in DC. Monogr. Phan. iii. 159–160; cfr. Weinmann in Flora, 1820, 733.

Upper Guinea. Cape Verd Isles, *Cardoso*, 61! *Hooker*, 101! Sierra Leone: near Wallia, *Scott-Elliot*, 4250! Lagos, *Millen*, 31! Niger Territory: Lower Niger, Stirling Hill, *Ansell!* Cameroons: Yaunde, *Zenker & Staudt*, 344!

Nile Land. Nubia: Soturba Mountains, *Schweinfurth*, 533! Hor Tamanib, near Suakin, *Lord!* Eritrea: Damas Valley, 1600 ft., *Schweinfurth & Riva*, 1180! Mogod Valley, 4500 ft., *Schweinfurth & Riva*, 1607! Galabat; region of Matamma, *Schweinfurth*, 530! Abyssinia: Tigre; Sholoda Mountain, near Adowa, 6700 ft., *Schimper*, 341! Shoa; Alia Amba, near Ankober, *Roth!* Somaliland: Golis Range, *Mrs. Lort-Phillips!* Shaile (? Sheikh) Pass, *Miss Edith Cole!* British East Africa: Uganda; near Kampala, *Scott-Elliot*, 7268! Nyika country, near Mombasa, *Wakefield!*

Lower Guinea. French Congo: Loango, *Soyaux*, 102! Lower Congo: Bingila, *Dupuis!* Angola: Loanda, *Welwitsch*, 6621! Cazengo, *Welwitsch*, 6611! Golungo Alto; near Bango, *Welwitsch*, 6598! Pungo Andongo; in thickets on the huge rocks of the Præsidium, 2400–3800 ft., *Welwitsch*, 6646! Huilla; Morro de Monino, 3800–5500 ft., *Welwitsch*, 6582!

South Central. Congo Free State: M'towa, on Lake Tanganyika, *Descamps!*

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; Hill of Tette, *Kirk!* British Central Africa: Ngamiland: Kwebe, near Lake Ngami, 3300 ft., *Lugard*, 243! *Mrs. Lugard*, 148! Zambesi Valley; Shesheke, *Holub!* Matabeleland, *Elliott!*

Very common through the tropical and subtropical regions of the Old World.

Usually recognised by the broad-elliptic leaves subobtuse at either end and the funnel-shaped spathes. The leaves are usually hairy, sometimes glabrate (though in that case often rufous-ciliate at the top of the leaf-sheath). Neither in this nor in other species of *Commelina* do I find either the quantity or the colour of the hairs constant. Various other species of *Commelina* are similarly amphicarpic. The example of Schweinfurth, 1607, at Kew, distributed as *C. beccariana*, Mart., is *C. benghalensis*, Linn., with a piece of *C. Petersii* mixed with it. But *C. beccariana* is described as having a yellow flower, so that it is not *C. benghalensis*.

Var. *β hirsuta*, C. B. Clarke in DC. Monogr. Phan. iii. 160. Leaves longer and more hairy, sometimes very villous with brown or rufous hairs.—Martelli, Fl. Bogos. 87; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 53; Rendle in Cat. Afr. Pl. Welw. ii. 76. *C. hirsuta*, R. Br. in Salt, Abyss. Append. 63; Hassk. in Schweinf. Beitr. Fl. Aethiop. 295. *C. kilimandscharica*, K. Schum. in Engl. Pfl. Ost-Afr. C. 134. *C. latifolia*, Hochst., partly, not of A. Rich. as see DC. Monogr. Phan. iii. 160.

Upper Guinea. Togoland: Misahöhe, *Baumann*, 403!

Nile Land. Abyssinia, *Parkyns!*

Lower Guinea. Angola: Loanda; in thickets at Alto das Cruzes, *Welwitsch*, 6622!

Mozamb. Dist. Zanzibar, *Goodwin!* German East Africa: Kilimanjaro; Marangu, 4900 ft., *Volkens*, 2254! British Central Africa: Nyasaland, *Buchanan*, 464!

This variety is also common in India.

Schweinfurth gives many localities for this variety in Eritrea; the numbers, however, he cites (so far as I have seen them) I should rather call typical *C. benghalensis*, Linn.; but no line can be drawn between the species and the Var. *β hirsuta*.

16. **C. uncata,** *C. B. Clarke in DC. Monogr. Phan.* iii. 169. Spathe having its midrib (keel) strongly curved. Capsule ¼ in. long, some-

times perfecting 5 seeds; dorsal cell indehiscent or dehiscing very late; seeds larger than those of *C. benghalensis*, wrinkled, obscurely reticulate; otherwise as *C. benghalensis*.—Durand & Schinz, Conspect. Fl. Afr. v. 428. *C. latifolia*, Hochst. in Schimper, Exsicc. 2269.

Nile Land. Abyssinia: Agow Country: mountains near Gageros, 4000 ft., *Schimper*, 2269! Gursarfa, *Schimper*, 1499!

The affinity of this species with *C. benghalensis* is so close that it might be treated as a variety of it.

17. **C. congesta,** *C. B. Clarke in DC. Monogr. Phan.* iii. 160. Robust, nearly glabrous. Leaves $4\frac{1}{2}$ by $1\frac{1}{8}$ in., lanceolate, acuminate to an acute tip. Spathes several close together near the end of the branches, more than $\frac{3}{4}$ in. long, glabrate; peduncles less than $\frac{1}{8}$ in. long. Capsules generally 3-seeded, the two lower ovules of the ventral cells not producing seeds. Seeds ellipsoid, smooth, dusky. Flowers white (*Soyaux*).—Durand & Schinz, Conspect. Fl. Afr. v. 424. *C. Heudelotii*, C. B. Clarke in DC. Monogr. Phan. iii. 184; Durand & Schinz, Conspect. Fl. Afr. v. 425.

Upper Guinea. Senegambia, *Heudelot*, 788!

Lower Guinea. Loango: near Chinchocho, *Soyaux*, 47!

Soyaux, 47, is the type above described. The example of Heudelot, which is imperfect, shows the spathes less approximate, the lower peduncled, and may not be the same plant. But the capsule and seeds are the same.

18. **C. condensata,** *C. B. Clarke in DC. Monogr. Phan.* iii. 190. Branches seen 9 in. long, undivided except at the tip, glabrate; internodes 1–2 in. long. Leaves 3 by 1–$1\frac{1}{8}$ in., elliptic-lanceolate, acute, when mature inconspicuously hairy on both surfaces, at the base broadly cuneate, unequal, sessile; leaf-sheaths with long loose hairs. Spathes in a terminal head, $\frac{1}{2}$ in. long, obliquely funnel-shaped, nearly glabrous. Capsule exceeding $\frac{1}{4}$ in. long; each ventral cell with one seed in the upper part; the dorsal cell with one seed, dehiscent. Seeds of the ventral cells $\frac{1}{10}$ in. long, ellipsoid, smooth, brown.—Durand & Schinz, Conspect. Fl. Afr. v. 424.

Upper Guinea. Fernando Po, *Mann*, 91 partly!

The capsule has only 3 seeds, but I believe it was 5-ovuled; I have therefore altered its place. It is so near *C. congesta* that it may prove to be only a variety of it.

19. **C. zambesica,** *C. B. Clarke in DC. Monogr. Phan.* iii. 161. Robust, more or less hairy. Leaves $5\frac{1}{2}$ by $1\frac{1}{4}$ in., narrowly elliptic, lanceolate, and acute at the tip, narrowed at the base. Peduncles solitary, mostly longer than the leaf-sheaths; uppermost leaves generally reduced, the uppermost sheath frequently without a blade. Spathes $\frac{3}{4}$–1 in. long, very broadly ovate, scarcely acuminate, hispid, not striated by coloured nerves; the margins connate at the base for $\frac{1}{6}$–$\frac{1}{4}$ in. Petals blue. Capsule rather more than $\frac{1}{4}$ in. long; normally 5-seeded; ventral face appears quadrate with 4 knobs; seeds subglobose, obscurely tetrahedral, nearly smooth.—Durand & Schinz, Conspect. Fl. Afr. v. 429.

C. communis, Baker in Trans. Linn. Soc. xxix. 163. *C. sambesiaca*, K. Schum. in Engl. Pfl. Ost-Afr. C. 135. *Commelina sp.* n. 1, T. Thoms. in Speke, Nile, Append. 650.

Mozamb. Dist. Zanzibar, *Speke & Grant!* German East Africa: Rovuma, River, *Kirk!* Portuguese East Africa: Lower Zambesi: opposite Sena, *Kirk!* banks of the River Shire, near Morambala Mountain, *Kirk!* Shupanga, *Kirk!* Zambesi Delta; mouth of the Kongoni River, *Kirk!* British Central Africa: Nyasaland; Plains of Zomba, 2500–3500 ft., *Whyte!* Lake Nyasa, *Simons!*

The leaves are used as spinach according to Speke & Grant.

20. **C. boissieriana,** *C. B. Clarke in DC. Monogr. Phan.* iii. 161. Nearly glabrous. Leaves 3½ by ⅔ in., lanceolate, sessile. Peduncles scattered, exserted ½ in. from the leaf-sheaths. Spathes 1 in. long, broadly ovate, acute, thinly hairy, margins connate at the base. Petals blue. Capsule ⅓ in. long, broadly oblong, obtuse, soon 3-valved; seed of the dorsal valve smooth; seeds of the ventral cells unknown.—Schweinf. in Bull. Instit. Égypt. 1887, 329 (36 in reprint); Aschers. & Schweinf. in Mém. Instit. Égypt. ii. 776 (154 in reprint); Durand & Schinz, Conspect. Fl. Afr. v. 424; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 53.

Nile Land. Eritrea: Geleb, 5000 ft., *Schweinfurth*, 117. Ginda, 3300 ft., *Schweinfurth*, 437. Keren, *Steudner*, 1481, 1483. Abyssinia, *Gaillardet*, 297!

Also in Extratropical Egypt.

This species was founded on Gaillardet, 297, in which the capsule was imperfect; and it is very possibly the same plant as *C. Schinzii* described below.

21. **C. Forskalæi,** *Vahl, Enum.* ii. 172. Glabrous, grey-puberulous or pubescent. Stems 8–24 in. long, much branched, weak rooting from the lower nodes. Leaves up to 2 by ⅔ in., oblong or scarcely elliptic, tips usually obtuse, never acuminate, margins often wavy. Peduncles scattered, exserted ⅛–⅓ in. from the leaf-sheaths. Spathes attaining ½–⅔ in. long, obliquely funnel-shaped, glabrate or sparsely hispid. Petals blue. Capsule small, 3–1-seeded; dorsal cell scabrous, subindehiscent, 1-seeded; ventral cells of the ovary 2-ovuled, 0–1-seeded; seeds of the ventral cells small, subglobose, smooth.—Kunth, Enum. iv. 49; Benth. in Hook. Niger Fl. 542 in obs.; Hassk. in Schweinf. Beitr. Fl. Aethiop. 208, 295; C. B. Clarke in DC. Monogr. Phan. iii. 168 incl. all vars.; Durand & Schinz, Conspect. Fl. Afr. v. 425; Hook. f. Fl. Brit. Ind. vi. 371; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 56; K. Schum. in Engl. Pfl. Ost-Afr. C. 135; Rendle in Journ. Linn. Soc. xxx. 430, and in Cat. Afr. Pl. Welw. 77. *C. falcata*, Hassk. in Peters, Reise Mozamb. Bot. 527. *C. Kotschyi*, K. Schum. in Engl. Pfl. Ost-Afr. C. 135, not of Hassk.

Upper Guinea. Cape Verd Isles, *Cardoso*, 253! Senegal, *Roger*, 93! *Perrottet*, 766! Senegambia, *Heudelot*, 276! *Leprieur!* Bornu, *Vogel*, 67! Niger Territory: Nupe, *Barter*, 1477!

Nile Land. Nubia: Wady Erkowit, near Suakin, *Schweinfurth*, 286! coast to between 3000 and 4000 ft., *Bent!* Kordofan: Bir Sodari, *Pfund*, 188! Gebel Kurbag, *Pfund*, 357! 795! Obeyad, *Pfund*, 367! on plains, *Kotschy*, 34! Arashkol Mountain, *Kotschy*, 105! Eritrea: Mount Ghedem, near Massowa, *Schweinfurth & Riva*, 113! Otoumbo, near Massowa, *Schweinfurth & Riva*, 196! near Saati, *Schweinfurth & Riva*, 338! Galabat: region of Matamma, *Schweinfurth*, 532!

Abyssinia: near Schumdalake, 4000 ft., *Schimper*, 380! Somaliland, *Mrs. Lort-Phillips! Donaldson Smith!* British East Africa: Nyika country near Mombasa, *Wakefield!* Witu, *Thomas*, 203!

Lower Guinea. Angola: Pungo Andongo; in damp meadows by the River Cuanza, near Nbilla, *Welwitsch*, 6634! Damaraland, *Een!*

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1053! *Kirk!* German East Africa: Tanga, *Holst*, 2078! Portuguese East Africa: Zambesi Delta; mouth of the River Kongoni, *Kirk!* Lower Zambesi; between Lupata and Tete, *Kirk!* British Central Africa: Rhodesia; Zambesi Valley, at Shesheke, *Holub!* Ngamiland: Kwebe, near Lake Ngami, *Lugard*, 136! *Mrs. Lugard*, 147! Matabeleland, *Elliott!*

Also in Arabia, Socotra, Mascarenia, Southern India.

In this species, as in *C. benghalensis*, stolons or basal almost leafless branches carry abnormal, often apetalous, flowers, and produce capsules usually abnormal, often 1-seeded.

22. **C. africana,** *Linn. Sp. Pl. ed.* i. 41, *ed.* ii. 60. Nearly glabrous. Stems 1–3 ft. long, rambling, much divided, almost woody at the very base, with thick roots. Leaves 3 by $\frac{3}{4}$ in., or much smaller, oblong, nearly sessile, usually obtuse at the base, often with rusty hairs at the mouth of the sheath. Spathes scattered, on peduncles exserted $\frac{1}{6}$–$\frac{2}{3}$ in., varying in length (in one example) from $\frac{3}{4}$–$2\frac{1}{4}$ in., simply folded, ovate, commonly triangular at the top, sometimes acuminate or rarely caudate-attenuate, glabrous or nearly so with white margins. Petals yellow. Filaments often $\frac{1}{4}$ in. long. Ovary 5-ovuled. Capsule nearly always 1-seeded, i.e., the dorsal cell falls off apparently quite indehiscent, while the four ovules in the two ventral cells (after swelling somewhat) remain infertile; occasionally the upper ovule in each ventral cell produces a perfect cylindric-ellipsoid reticulated seed.—Gærtn. Fruct. i. 50, t. 15, fig. 1; Lam. Encycl. ii. 67, Ill. t. 35; Schmidel, Ic. i. 113, t. 30; Red. Lil. t. 207; Gawler in Bot. Mag. t. 1431; C. B. Clarke in DC. Monogr. Phan. iii. 164, and in Dyer, Fl. Cap. vii. 9; Durand & Schinz, Conspect. Fl. Afr.v. 422; K. Schum. in Engl. Pfl.Ost-Afr.C. 135; Rendle in Journ. Linn. Soc. xxx. 429, and in Trans. Linn. Soc. ser. 2, Bot. iv. 52; Hua in Bull. Mus. Hist. Nat. Par. i. 119. *C. angolensis*, C. B. Clarke in DC. Monogr. Phan. iii. 167; Engl. Hochgebirgsfl. Trop. Afr. 155; Durand & Schinz, Conspect. Fl. Afr. v. 423; Rendle in Cat. Afr. Pl. Welw. ii. 77. *C. involucrosa*, C. B. Clarke in DC. Monogr. Phan. iii. 165 partly. *C. Elliotii*, C. B. Clarke & Rendle in Journ. Linn. Soc. xxx. 98. *Hedwigia africana*, Medicus in Roem. & Usteri, Mag. x. 124.

Upper Guinea. Sierra Leone: between Kahreni and Port Lokko, *Scott-Elliot*, 5749!

Nile Land. Habab, 6000 ft., *Hildebrandt*, 368! Eritrea: Saganeiti, 6800–7000 ft., *Schweinfurth & Riva*, 1701! Abyssinia: Samen; Shoata, *Schimper*, 590! Shoa, *Petit!* British East Africa: Niamniam: by the River Nabambisso, *Schweinfurth*, 3739! and Makporru Hill, *Schweinfurth*, 3797! British East Africa: Leikipia; Njoro Larabwal, *Gregory!* Machakos, 5000–6000 ft., *Scott-Elliot*, 6388!

Lower Guinea. French Congo: Bramaya, *Paroisse*, 196. Angola: Huilla, 3500–5800 ft.; near Lopollo, *Welwitsch*, 6581! Monino, *Welwitsch*, 6583! Morro de Lopollo, *Welwitsch*, 6593! Pungo Andongo; Sobato Cabanga, *Welwitsch*, 6626! German South-west Africa: Upingtonia; Ovambate, *Schinz*, 28!

Mozamb. Dist. German East Africa: Kilimanjaro; at Marangu, 5000–5500 ft., *Volkens*, 1244! 2324! British Central Africa: Urungu; Fwambo, *Carson*, 25! Kambole, South-west of Lake Tanganyika, 5000 ft., *Nutt!* Nyasaland; marshy promontory of Lake Shirwa (Chilwa), *Meller!* Zomba Rock, *Whyte!* Mount Sochi, *Scott-Elliot*, 8525! Mount Mlanji, *Whyte!* and without precise locality, *Buchanan*, 338! Ngamiland: edge of the rivers near Lake Ngami, *McCabe*, 24! along the River Chobe, *McCabe*, 47!

Frequent also in the Mascarene Islands and Extratropical South Africa.

This is a very common species; and the plentiful material shows that, on the same plant, the length and acumination of the spathe varies excessively, and that the leaves vary considerably from oblong to elliptic-oblong. Where there is no fruit and the colour of the flowers is not noted, I have (in general) not cited the example in the foregoing geography. The plant is frequent in Abyssinia, and Schweinfurth gives many localities which are not copied here, though I do not doubt that his numbers are either *C. africana*, or one of the species following (*C. edulis*, *C. involucrosa*), which I am not sure to differ. In *C. Elliotii*, the capsule is noted to be 5-seeded, but the plant is otherwise very exactly *C. africana*, in which there are always 5 ovules. As to Schimper, 590, it is larger than *C. africana* usually is in leaf, spathe, and capsule, and it may be A. Richard's *C. involucrosa*; but, if so, I fear *C. involucrosa*, A. Rich., is not distinct from *C. africana*.

23. **C. edulis,** *A. Rich. Tent. Fl. Abyss.* ii. 341. Leaves elliptic, not lanceolate; stems and sheaths marked by a longitudinal line of hairs; three interior sepals heart-shaped and equal; otherwise as *C. africana*.—Schweinf. Beitr. Fl. Aethiop. 295; C. B. Clarke in DC. Monogr. Phan. iii. 165; Durand & Schinz, Conspect. Fl. Afr. v. 425; Engl. Hochgebirgsfl. Trop. Afr. 155. *C. beccariana*, Martelli, Fl. Bogos. 87; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 54.

Nile Land. Eritrea: Mogod Valley, 4500 ft., *Schweinfurth & Riva*, 1608! Abyssinia: Tigre; Mount Sholoda, near Adowa, 6760 ft., *Schimper*, 60! Wojerat district, *Petit*; Shoa, *Petit!*

The above is condensed from A. Richard's description. The only part of the differences alleged that appears distinctive is the broader leaves. The specimen of *C. edulis* in herb. Kew. from herb. Franqueville (believed to be a piece of A. Richard's type) agrees very well with the description; the upper leaves are $1\frac{3}{4}$ by $\frac{3}{4}$ in., more elliptic than as in *C. africana*. The spathe in this type specimen is less than $\frac{3}{4}$ in. long, not acuminate, but hardly differs from some spathes to be found in *C. africana*. This type shows no capsule; but it is either closely allied to *C. africana*, or to be united therewith. Buchanan, 6360, from Nyasaland, and Scott-Elliot, 8525, from the Shire Highlands, have the leaves elliptic at the base, but they do not match *C. edulis*, and are rather forms of *C. africana*.

24. **C. involucrosa,** *A. Rich. Tent. Fl. Abyss.* ii. 342. Very large. Leaves sheathing at the base, sessile, lanceolate, acute, pubescent and ciliate when young. Spathes 2–$2\frac{1}{2}$ in. long, long-peduncled, simply folded, hairy ciliate on the margin.—Schweinf. Beitr. Fl. Aethiop. 295; C. B. Clarke in DC. Monogr. Phan. iii. 165 (excl. Schweinf. 590); Durand & Schinz, Conspect. Fl. Afr. v. 425.

Nile Land. Abyssinia: Tigre; Tchelalchekenneh, *Quartin-Dillon*.

No type of this has been seen; the above is condensed from A. Richard, who was "disposed to believe the flowers yellow." Assuming the flowers yellow, and noting the large size of the plant, A. Richard's *C. involucrosa* was probably the plant of

C. B. Clarke in DC. Monogr. Phan. l.c.—i.e., Lord's plant from Hor Tamanib, near Suakin; in this: Leaves up to 5 by 1 in. Peduncles 1 in. long, stout, pubescent. Spathes $2\frac{1}{2}$ in. long, pubescent.

25. **C. krebsiana,** *Kunth, Enum.* iv. 40. Leaves hairy on both surfaces when mature; otherwise as *C. africana*.—C. B. Clarke in Dyer, Fl. Cap. vii. 10. *C. africana*, var. *krebsiana*, C. B. Clarke in DC. Monogr. Phan. iii. 164; Engl. Hochgebirgsfl. Trop. Afr. 154; Durand & Schinz, Conspect. Fl. Afr. v. 423; Rendle in Cat. Afr. Pl. Welw. ii. 76. *C. karooica*, var. *Barberæ*, Hua in Bull. Mus. Hist. Nat. Par. i. 119?

Upper Guinea. Cameroons: Yaunde, *Zenker*, 1499!

Nile Land. Eritrea: Habab, 6000 ft., *Hildebrandt*, 367! British East Africa: White Nile, at the mouth of the Bahr el Gebel, *Schweinfurth*, 1132!

Lower Guinea. Angola: Pungo Andongo; in thickets between Catete and Quilanga, *Welwitsch*, 6635! and between Pungo Andongo and the River Cuanza, *Welwitsch*, 6640!

Mozamb. Dist. British Central Africa: Niomkolo Island, in Lake Tanganyika, *Carson!* Matabeleland, *Elliott!* Gold-fields, *Baines!*

Also in Extratropical South Africa.

The plant of Baines is hispid, and altogether like the *C. krebsiana* of the Kalahari. The leaves in Schweinfurth, 1132, are softer with shorter denser hair, and may indicate an additional species.

Var. *β villosior*, C. B. Clarke in Dyer, Fl. Cap. vii. 10. Leaves elliptic, 2 by $\frac{3}{4}$ in. Whole plant softly hairy, not hispid.—*C. barbata*, var. *β villosior*, C. B. Clarke in DC. Monogr. Phan. iii. 167, not of Lam.; Hua in Bull. Mus. Hist. Nat. Par. i. 119. *C. africana*, var. *polyclada*, C. B. Clarke in DC. Monogr. Phan. iii. 165; Rendle in Cat. Afr. Pl. Welw. ii. 76.

Lower Guinea. Angola: Huilla; in cultivated fields near Lopollo, *Welwitsch*, 6581!

Mozamb. Dist. Rhodesia: Leshumo Valley, south of the Zambesi, *Holub!*

Frequent in Extratropical South Africa.

26. **C. cordifolia,** *A. Rich. Tent. Fl. Abyss.* ii. 341. Leaves oval-oblong acute, sessile, sub cordate at the base, with soft hairs on both surfaces. Peduncles exceeding $1\frac{1}{2}$ in. in length; spathes very large, cordate-oblong, acute, simply folded, hairy, ciliate on the margins. Flowers yellow.—Schweinf. Beitr. Fl. Aethiop. 295; C. B. Clarke in DC. Monogr. Phan. iii 165; Durand & Schinz, Conspect. Fl. Afr. v. 425; K. Schum. in Engl. Pfl. Ost-Afr. C. 135.

Nile Land. Abyssinia: Tigre; Adowa, *Quartin-Dillon*. Somaliland, *Mrs. Lort-Phillips!*

Mozamb. Dist. German East Africa: Usagara (ex *K. Schumann*).

No authentic example has been seen; the description above is condensed from A. Richard, from which there can be little doubt that Mrs. Lort-Phillips' plant belongs to the species; in this: Leaves 3 by $1\frac{2}{3}$ in., distinctly cordate at the base. Peduncles exceeding 2 in. long, hairy. Spathe 1–$1\frac{1}{4}$ in. long, $1\frac{1}{2}$ in. broad. Capsule perfecting 1 seed in an indehiscent deciduous cell. This is a strongly marked species.—K. Schumann's may have been *C. Buchanani* (the following species).

27. **C. Buchanani,** *C. B. Clarke*. Nearly glabrous. Straggling, the internodes up to 4–6 in. long. Leaves 4 by $\frac{3}{4}$–1 in., elliptic-lanceolate,

acute, suddenly contracted at the base. Peduncles scattered, 1–2 in. long. Spathes up to 3 in. long, ovate-lanceolate, long-attenuate, very nearly glabrous; margins free at the base. Flowers large, "pale yellow" (*L. Scott*), some long exserted from the spathe; in the dried examples 2 petals yellow, the third smaller and brownish. Filaments $\frac{1}{4}$ in. long. Capsule of the section *Heterocarpus*.

Nile Land. British East Africa: Ukamba; Kitui, *Hildebrandt*, 2643! Rabai Hills, near Mombasa, *Taylor!*

Mozamb. Dist. British Central Africa: Nyasaland; Blantyre, *Scott!* Shire Highlands, *Buchanan*, 285!

This differs from all the species of the *C. africana* group (except *C. involucrosa*) by its large spathes; it is too glabrous to be put with *C. involucrosa*, nor does the leaf-base match.

28. **C. Kirkii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 167. Nearly glabrous. Stems 15 in. long, with internodes 2–3 in. long. Leaves 4–6 by $\frac{1}{4}$–$\frac{1}{3}$ in., linear or scarcely linear-lanceolate. Peduncles $\frac{1}{2}$–$1\frac{1}{2}$ in. long towards the ends of the branches. Spathes $1\frac{3}{4}$–$2\frac{1}{4}$ in. long, lanceolate long-attenuate; margins free at the base. Flowers yellow, some much exserted from the spathe. Capsule (though not seen well ripened) of the section *Heterocarpus*.—Durand & Schinz, Conspect. Fl. Afr. v. 426; K. Schum. in Engl. Pfl. Ost-Afr. C. 135.

Mozamb. Dist. Portuguese East Africa: Moramballa Mountain, 1000–3000 ft., *Kirk!* British Central Africa: Nyasaland; Ndirandi Mountain, near Blantyre, *Scott-Elliot*, 8498! Shire Valley, *Waller!*

Also in Mauritius.

29. **C. boehmiana,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 135. Stems 12–14 in. long, pubescent at the top. Leaves up to 4 by $\frac{3}{5}$ in., elongate-lanceolate, puberulous on both faces. Spathes cordate, acuminate, not turbinate (i.e., margins at the base free). Seeds $\frac{1}{8}$ in. long, pitted, black.

Mozamb. Dist. German East Africa: Unyamwezi; Gonda (Igonda), *Boehm*, 12.

K. Schumann does not mention the colour of the flowers nor describe the capsule; but he says the species is close to *C. Kirkii*, from which it is supposed the flowers are yellow, the dorsal cell of the capsule indehiscent and 1-seeded. If these things are not so, the species may belong to some different section of the genus.

30. **C. Mannii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 167. Very sparingly hairy. Stems up to 12 in. long, weak; internodes up to 2 in. long. Leaves up to $1\frac{1}{4}$ by $\frac{2}{3}$ in. (mostly smaller), elliptic, tip triangular and subobtuse. Peduncles few, near the tops of the branches, scarcely $\frac{1}{8}$ in. longer than the leaf-sheaths. Spathes $\frac{1}{2}$ in. long, ovate, not acuminate; margins free at the base. Capsule small; in each ventral cell 1 reticulated seed; in the dorsal indehiscent cell 1 seed closely sticking to the cell-wall.—Engl. Hochgebirgsfl. Trop. Afr. 155; Durand & Schinz, Conspect. Fl. Afr. v. 426. *Commelina sp.*, Hook. f. in Journ. Linn. Soc. vii. 223.

Upper Guinea. Cameroons: Cameroon Mountain, 7000 ft., *Mann*, 2136!

Var. β *Lyallii*, C. B. Clarke in DC. Monogr. Phan. iii. 168. Rather stouter. Peduncles a little longer. Seeds slightly pitted, not distinctly reticulated.—*C. amplexicaulis*, Hassk. in Schweinf. Beitr. Fl. Aethiop. 208, 295; Durand & Schinz, Conspect. Fl. Afr. v. 423? *C. edulis*, A. Rich., forsan var. ex C. B. Clarke in DC. Monogr. Phan. iii. 165.

Nile Land. Abyssinia: Samen; Kabere, 10,000 ft., *Schimper*, 573! Ankober, *Roth*, 175! and without precise locality, *Plowden!*

Also in Madagascar.

31. **C. Kotschyi,** *Hassk. in Schweinf. Beitr. Fl. Aethiop.* 207, 295. Nearly glabrous. Leaves $2\frac{1}{4}$ by $\frac{2}{3}$ in., subsessile, very little narrowed at the base; margins often crenulated. Spathes 2 (or 3–1) near the ends of the branches, exserted scarcely $\frac{1}{4}$ in. from the leaf-sheaths, $\frac{1}{2}$–$\frac{2}{3}$ in. long, very broadly ovate, obtuse or with a very short point (not acuminate); margins free or very shortly and obscurely connate at the base. Petals intensely blue (*Welwitsch*). Capsule more than $\frac{1}{4}$ in. long, quadrate-oblong, constricted in the middle, flat; the dorsal-cell absent, or rudimentary, or small and 1-seeded. Seeds $\frac{1}{8}$ in. long or rather more, cylindric-ellipsoid, smooth, brown.—C. B. Clarke in DC. Monogr. Phan. iii. 173; Durand & Schinz, Conspect. Fl. Afr. v. 426; K. Schum. in Engl. Pfl. Ost-Afr. C. 135, partly; Rendle in Cat. Afr. Pl. Welw. ii. 77. *C. Forskailii*, Hochst. ex C. B. Clarke in DC. Monogr. Phan. iii. 173. *Dissecocarpus Kotschyi*, Hassk. ex C. B. Clarke in DC. Monogr. Phan. iii. 173.

Nile Land. Kordofan, *Kotschy*, 34!

Lower Guinea. Angola: Barra do Bengo; between Teba and Cacuaco, *Welwitsch*, 6624! Loanda; near Quicuxe, *Welwitsch*, 6614! in the dense thickets of Alto das Cruzes, *Welwitsch*, 6620!

32. **C. imberbis,** *Hassk. in Schweinf. Beitr. Fl. Aethiop.* 209, 295. Nearly glabrous, even to the mouths of the leaf-sheaths. Stems 1–2 ft. high, suberect at the base, with internodes 2–3 in. long; roots long, rather thick. Leaves 5 in. long, varying from $1\frac{1}{2}$–$\frac{3}{4}$ in. in breadth, from ovate-lanceolate to narrow-lanceolate; the upper sessile dilated (often rounder or auricled) at the base. Peduncles few, scattered, exserted $\frac{1}{2}$–$1\frac{1}{2}$ in. from the leaf-sheaths. Spathes 1–$1\frac{1}{4}$ by $1\frac{1}{2}$ in., very broadly ovate, triangular acute at the tip, green, nearly glabrous, not conspicuously nerved; margins free, or very nearly so. Corolla blue. Capsule $\frac{1}{4}$–$\frac{1}{3}$ in. long, oblong-quadrate, 4-seeded. Seed ellipsoid, brown, obscurely wrinkled or pitted (nearly smooth).—*C. latifolia*, C. B. Clarke in DC. Monogr. Phan. iii. 173, partly.

Nile Land. Eritrea: lower part of Damas Valley, 1600 ft., *Schweinfurth & Riva*, 1181! Abyssinia: Tigre; Melata, 5000 ft., *Schimper*, 576! Mount Sholoda, near Adowa, *Quartin-Dillon & Petit*, 13! Soudan, *Fenton!* Somaliland: Darror, *James & Thrupp!* Harradigit, *James & Thrupp!* British East Africa: Machakos, *Hinde!* Rabai Hills, near Mombasa, *Taylor!*

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1054! British Central Africa: Lake Tanganyika, *Cameron!* Kavala Islands, *Carson*, 24! 25! Nyasaland: Kondowe to Karonga, 2000–6000 ft., *Whyte!* Ngamiland; Kwebe, *Lugard*, 146! 244!

Also in Madagascar.

The variation in the leaves in this species is very great; in Quartin-Dillon & Petit, 13, the upper leaves are ovate, sessile, and rounded at the base, the lower lanceolate; while the lowest has a quasi-petiole $\frac{3}{4}$ in. long.

Var. *loandensis*, C. B. Clarke. Leaves (even the upper ones) narrowed at the base into a short quasi-petiole.—*C. latifolia*, Rendle in Cat. Afr. Pl. Welw. ii. 77, partly.

Lower Guinea. Angola: Loanda; about Alto das Cruzes, *Welwitsch*, 6613! at Praia de Zamba, near Loanda, *Welwitsch*, 6616! near Maianga de Povo, *Welwitsch*, 6618! Ambriz; near the River Quizembo, *Welwitsch*, 6615!

33. **C. Petersii,** *Hassk. in Peters, Reise Mossamb. Bot.* 522. Nearly glabrous. Stems 18 in. long, with internodes 2–3 in. long. Leaves 4–5 by $\frac{3}{4}$ in., oblong-lanceolate, acuminate, rather suddenly contracted at the base, often very shortly quasi-petiolate. Peduncles scattered, near the top of the stem, exserted $\frac{1}{2}$–1 in. from the leaf-sheaths. Spathes 1 by $\frac{2}{3}$ in., elliptic or ovate, acuminate, glabrous or very nearly so, with obscure longitudinal green nerves; margins nearly or quite free at the base. Petals blue. Capsule $\frac{1}{3}$ in. long, 4-seeded; the dorsal cell sometimes present, usually empty. Seeds oblong-ellipsoid, with transverse wrinkles and pits.—Hassk. in Flora, 1863, 385; C. B. Clarke in DC. Monogr. Phan. iii. 169; Durand & Schinz, Conspect. Fl. Afr. v. 427; K. Schum. in Engl. Pfl. Ost-Afr. C. 135.

Lower Guinea. German South-west Africa: Amboland; Olukonda, *Schinz*, 6!

Mozamb. Dist. Portuguese East Africa: Lower Zambesi, at Shiramba, *Kirk!* Mozambique, *Peters!*

This is near *C. boissieriana*, but differs from that (as from *C. Schinzii*) by its much narrower spathes.

34. **C. latifolia,** *A. Rich. Tent. Fl. Abyss.* ii. 340. Slightly hairy or glabrate. Stem 15–30 in. long, rather weak, with long internodes, decumbent and rooting at the base; roots fibrous, not thickened. Leaves $3\frac{1}{2}$ by $\frac{3}{4}$ in., oblong-lanceolate, sessile, dilated at the base; upper leaves often cordate, eared or nearly sagittate at the base. Peduncles solitary, 2 or 1 near the top of a branch, exserted $\frac{1}{2}$–1 in. from the leaf-sheath. Spathes $\frac{3}{4}$ in. long or rather more, broadly ovate, with a short acute point, not acuminate, very thinly hispid, slenderly striate; margins very shortly connate at the base. Petals (dried) blue. Capsule $\frac{1}{4}$ by $\frac{1}{4}$–$\frac{1}{5}$ in., 4-seeded. Seeds globose, brown, nearly smooth.—Hassk. in Schweinf. Beitr. Fl. Aethiop. 295; C. B. Clarke in DC. Monogr. Phan. iii. 173 partly; Durand & Schinz, Conspect. Fl. Afr. v. 426; Durand & De Wild. in Bull. Soc. bot. Belg. xxxvii. 128; K. Schum in Engl. Pfl. Ost-Afr. C. 135; Schweinf. in Höhnel. Zum Rudolph-See u. Stephanie-See, ii. 353, and in Verh. Zool.-Bot. Gesell. Wien, 1865, 556. *C. sagittifolia*, Hassk. in Schweinf. Beitr. Fl. Aethiop. 206, 295.

Nile Land. Kordofan: Abu Harara, *Pfund*, 114! Abyssinia: without precise locality, *Schimper*, 1686! *Pearce!* Somaliland, *Donaldson Smith!*

Lower Guinea. Lower Congo: Sicia, *Dupuis!*

Mozamb. Dist. Zanzibar, *Bojer!* German East Africa: Kilimanjaro; at Marangu, 5000 ft., *Volkens*, 2270! Usambara; Tanga; ***Holst*, 2079A!**

The plant above described is Schimper, 1686, which A. Richard took as the type of his *C. latifolia*, and Hasskarl as the type of his *C. sagittifolia*. The name *latifolia* is misleading, for the leaves cannot be called broad, though (as Rendle observes) they vary so greatly in width that they might be called polymorphous. The species must not be called *C. latifolia*, Hochst., as Hochstetter meant by that *C. benghalensis*, Linn., and issued various plants under that name. Schweinfurth and K. Schumann, in the places above cited, included probably *C. cuneata*, the species following, which is very closely allied to *C. latifolia*.

35. **C. cuneata,** *C. B. Clarke.* Nearly glabrate except the sparsely hispid spathe. Stem 18 in. long, with long internodes, suberect at the base; roots thick. Upper leaves $4\frac{1}{2}$ by $\frac{3}{4}$ in., lanceolate, cuneate at the base, almost into a quasi-petiole. Peduncle at the end of the branches; spathes, flowers, capsule, and seeds as of *C. latifolia*.

Mozamb. Dist. British Central Africa: Nyasaland; Kondowe to Karonga, 2000–6000 ft., *Whyte!* Kavali, *Carson!*

The spathe, with the strongly exserted lower cyme-stalk, appears identical with that of *C. latifolia*. There is, however, no example of *C. latifolia* that has the upper leaves like those of *C. cuneata*.

36. **C. spectabilis,** *C. B. Clarke in DC. Monogr. Phan.* iii. 175. Very hairy. Stem erect, 3–10 in. long, almost woody at the base with thick roots. Leaves 4 by $\frac{1}{2}$ in., oblong, dilated at the base, hairy on both surfaces. Peduncles scattered, exserted $\frac{3}{4}$–$1\frac{1}{2}$ in. from the leaf-sheaths. Spathes $\frac{3}{4}$–1 by $1\frac{1}{4}$ in., very broadly ovate, with triangular tip, very hairy; margins free to the base or very nearly so. Flowers numerous, blue. Capsule immature, probably nearly as of *C. huillensis*.—Durand & Schinz, Conspect. Fl. Afr. v. 428; Rendle in Cat. Afr. Pl. Welw. ii. 78.

Lower Guinea. Angola: Huilla; in woods near the River Monino, 3800–5500 ft., *Welwitsch*, 6594!

Var. *β ramosa*, C. B. Clarke in DC. Monogr. Phan. iii. 175. Less hairy. Stem 2 ft. long, decumbent, rooting at the nodes, much branched. Spathes rather smaller, scarcely $\frac{3}{4}$ in. long. Flowers bright dark blue (*Welwitsch*), not sky blue.—Rendle in Cat. Afr. Pl. Welw. ii. 78.

Lower Guinea. Angola: Pungo Andongo; in sandy marshes between Quibanga and Guinga, *Welwitsch*, 6629!

37. **C. Cecilæ,** *C. B. Clarke.* Hairy. Stem up to 18 in. long, repeatedly branched towards the top, with internodes 2–3 in. long. Leaves $3\frac{1}{2}$ by $\frac{3}{4}$ in., broadly triangular-oblong, hairy, densely fringed on the margins, sessile, rounded and much dilated at the base, sometimes 1 in. broad. Peduncles scattered towards the ends of the branches, white-hirsute, exserted $\frac{1}{2}$–2 in. from the leaf-sheaths. Spathes 1 by $1\frac{1}{2}$ in., broadly ovate-triangular, brown-purple, white-hirsute, not distinctly striate, margins free to the base or very nearly so. Flowers numerous, blue, rather large. Capsule not seen.

Mozamb. Dist. Matabeleland: Gwelo, *Hon. Mrs. Evelyn Cecil* 139!

38. **C. demissa,** *C. B. Clarke.* Pubescent. Stem 1 ft. long, branched, with internodes 1–3 in. long; leaves $3\frac{1}{2}$ by $\frac{1}{2}$ in., narrowly-oblong, attenuated at either end, when mature hairy on both faces. Peduncles scattered, exserted 0–$\frac{1}{3}$ in. from the leaf-sheath. Spathes $\frac{1}{2}$–$\frac{2}{3}$ in. long, ovate, acute, considerably smaller than in any other species of the *C. latifolia* group, hairy, with obscure longitudinal purple veins, margins free at the base. Petals blue when dry. Capsule scarcely $\frac{1}{5}$ in. long, square, 4-seeded. Seeds small, globose, dark brown, smooth.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Malosa, 4000–6000 ft., *Whyte!*

39. **C. madagascarica,** *C. B. Clarke in DC. Monogr. Phan.* iii. 174. Very nearly glabrous. Stem 15 in. long, much branched, with internodes 2–3 in. long. Leaves 2–$2\frac{1}{2}$ in. long, linear-lanceolate, except for a dilatation (not always present) at the very base. Peduncles scattered, near the end of the branches, exserted $\frac{1}{4}$ to $\frac{1}{2}$ in. from the leaf-sheaths. Spathes $\frac{1}{2}$–$\frac{2}{3}$ in. long, ovate, acute, not acuminate; margins nearly free to the base. Capsule (in *Scott-Elliot*, 7588) $\frac{1}{5}$ in. long, 4-seeded. Seeds globose, smooth, brown.—Durand & Schinz, Conspect. Fl. Afr. v. 426. *C. latifolia*, var. *angustifolia*, Schweinf. (MS. ?).

Nile Land. Eritrea: Ambelaco, near Maldi, 6500 ft., *Schweinfurth*, 131! British East Africa: Ruwenzori; Kasamaga, 6300 ft., *Scott-Elliot*, 7588!

Frequent in Madagascar.

This differs from *C. latifolia*, A. Rich., not only in the narrow leaves but in the spathes, which are very much smaller.

40. **C. huillensis,** *C. B. Clarke in DC. Monogr. Phan.* iii. 175. Stemless, or very nearly so; roots thick. Leaves 4–10 by $\frac{1}{4}$–$\frac{1}{3}$ in., dilated at the base, hairy. Peduncles radical, 4–7 in. long, shaggy towards the top. Spathes 1–$1\frac{1}{4}$ by $1\frac{1}{2}$ in., very broadly ovate, shaggy, with triangular tip; margins free. Cymes 2, with stout pedicels, the upper with numerous blue flowers. Capsules not ripe, nearly square, $\frac{1}{4}$ in. long, 4-seeded.—Durand & Schinz, Conspect. Fl. Afr. v. 425; Rendle in Cat. Afr. Pl. Welw. ii. 78.

Lower Guinea. Angola: Huilla; between Lopollo and Nene, 3800–5500 ft., *Welwitsch*, 6585!

41. **C. Carsoni,** *C. B. Clarke.* Hairy, the leaf-sheaths and spathes shaggy. Stems 1 ft. high, branched, suberect at the base, with internodes 2–$4\frac{1}{2}$ in. long. Leaves 2 in. long, curved, narrowly lanceolate or linear-lanceolate, except near the base, where there is a dilatation sometimes $\frac{1}{2}$ in. wide at the top of the leaf-sheath. Peduncles solitary towards the ends of the branches, erect, exserted 1–2 in. from the leaf-sheath. Spathes $\frac{3}{4}$ in. long, broadly ovate, acute, not acuminate; margins free to the base, or very nearly so. Capsule small, nearly quadrate, 4-seeded. Seeds subglobose, brown, nearly smooth.

Mozamb. Dist. British Central Africa: Tanganyika Plateau, at Fwambo, *Carson!*

42. **C. Welwitschii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 175. Scabrous-pubescent, or nearly glabrous. Stems 4–11 in. long, erect, thickened at the base, sometimes into bulbs $\frac{1}{3}$ in. in diam.; roots thickened. Leaves linear, 4–8 by $\frac{1}{4}$–$\frac{1}{3}$ in., or (in *Welwitsch*, 6639) exceeding 12 in., dilated at the base. Peduncles scattered, exserted 1–3 in. from the leaf-sheaths, mostly very pubescent. Spathes $\frac{3}{4}$–$1\frac{1}{4}$ in. long, ovate, acuminate acute, hairy or nearly glabrate; margins free. Two posticous petals yellow; anticous petal yellow-brown or dull violet-green (*Welwitsch*). Capsule nearly $\frac{1}{3}$ by $\frac{1}{5}$ in., 4-seeded. Seeds much longer than broad, wrinkled or obscurely reticulate.—Durand & Schinz, Conspect. Fl. Afr. v. 429; Rendle in Cat. Afr. Pl. Welw. ii. 78.

Lower Guinea. Angola: Pungo Andongo, 2400–3800 ft.; on the slopes of the volcanic rocks of the Præsidium, *Welwitsch*, 6627! damp rocks of Cabonda, on the Præsidium, *Welwitsch*, 6632! 6637! Cazella, *Welwitsch*, 6638! plentiful throughout the district on rocks and in damp pastures, *Welwitsch*, 6639! Huilla; plentiful in pastures at Humpata, 3800–5500 ft., *Welwitsch*, 6586!

There may be two species here; in 6627 the spathes are scarcely $\frac{3}{4}$ in. long, with conspicuous purple striations; in 6586 they are $1\frac{1}{4}$ in. long, green: in both these the two posticous petals are yellow, the anticous dull violet-green. The other numbers cited come all between these two extremes, nor have I been able to sort the species into two varieties.

43. **C. subcucullata,** *C. B. Clarke.* More or less hairy. Stems 1 ft. long, suberect at the base; internodes 2–$4\frac{1}{2}$ in. long. Leaves 4–$5\frac{1}{2}$ in. long, linear, but more or less dilated at the base, where they are sometimes $\frac{1}{2}$ in. wide. Peduncles solitary towards the ends of the branches, erect, exserted 1–2 in. from the leaf-sheaths. Spathes $\frac{3}{4}$ in. long, ovate-acuminate, acute, more or less hairy, pale brown, with purple longitudinal veins; the margins connate at the base for $\frac{1}{12}$–$\frac{1}{6}$ in. Petals (from the dried plant) appear yellow to brown-red. Capsule $\frac{1}{5}$ in. long, square, 4-seeded. Seeds globose, smooth, brown.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Malosa, 4000–6000 ft., *Whyte!* Mount Zomba, 4000–6000 ft., *Whyte!* Mount Mlanji, *Scott-Elliot*, 8675!

This may prove only a variety of *C. Carsoni.* The typical five specimens of Whyte, with acuminate highly coloured spathes, having the margins distinctly connate at the base, look distinct enough; but Scott-Elliot, 8675, has less acuminate, less coloured spathes, with nearly free margins, and looks half-way to *C. Carsoni.*

44. **C. neurophylla,** *C. B. Clarke.* Nearly glabrous. Branches 12–18 in. long; internodes 2–5 in. long. Leaves $3\frac{1}{2}$ by $\frac{1}{3}$ in. (usually narrow), linear-oblong or linear, often dilated at the base; longitudinal nerves 5–7, conspicuous in the dry specimens. Peduncles solitary towards the ends of the branches, exserted $\frac{1}{2}$–$2\frac{1}{2}$ in. from the leaf-sheath. Spathes $\frac{2}{3}$–$\frac{3}{4}$ in. long, triangular in outline, obliquely funnel-shaped, green, with obscure green longitudinal veins; margins connate, often for $\frac{1}{2}$ in. Petals blue. Capsule $\frac{1}{5}$ in. long, square, 4-seeded. Seeds globose, smooth, brown.

Mozamb. Dist. British Central Africa: Nyasaland; Tanganyika Plateau, 2000–3000 ft., *Whyte!* Nyika Plateau, 6000–7000 ft., *Whyte!* Kondowe to Karonga, 2000–6000 ft., *Whyte!* Mount Zomba, 4000–6000 ft., *Whyte!* Shire Highlands, *Buchanan!*

45. **C. echinosperma,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 135. Stems 12–18 in. high, erect, glabrous or puberulous. Leaves 4–6 by $\frac{1}{3}$–$\frac{2}{3}$ in., lanceolate or elongate-lanceolate, glabrous or puberulous. Spathe $\frac{2}{3}$–$\frac{3}{4}$ in. long, pubescent. Capsule $\frac{1}{4}$ in. long, subquadrate. Seeds globose, $\frac{1}{12}$ in. in diam., chestnut-brown, farinose, echinate.

Mozamb. Dist. German East Africa: Unyamwezi; Gonda (Igonda), Kakoma, *Boehm*, 2, 8.

K. Schumann does not say that the seeds are 4, but he places the species in Sect. *Dissecocarpus*. The subquadrate capsule implies 4 seeds.

46. **C. capitata,** *Benth. in Hook. Niger Fl.* 541. Nearly glabrous, except the spathes. Stems 1–3 ft. long. Leaves up to 5 by 1–$1\frac{3}{4}$ in., varying from broadly-oblong-lanceolate to lanceolate, subrhomboid, unequal-sided at the base. Spathes 3–8, collected into a quasi-terminal head, $\frac{2}{3}$–1 in. long, obliquely obovate; margins free nearly to the base, densely ciliate with rufous hairs, or nearly glabrate. Flowers yellow (or white, *H. H. Johnston*). Capsule oblong, 4-seeded. Seeds $\frac{1}{8}$–$\frac{1}{6}$ in. long, cylindric, deeply pitted.—C. B. Clarke in DC. Monogr. Phan. iii. 176; Durand & Schinz, Conspect. Fl. Afr. v. 424; Études Fl. Congo, i. 269; Durand & De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 87; Rendle in Cat. Afr. Pl. Welw. ii. 78.

Nile Land. British East Africa: east side of Lake Albert Edward, *Scott-Elliot*, 8027!

Upper Guinea. Senegal, *Perrottet*, 772! Sierra Leone: Luseniya, *Scott-Elliot*, 4080! and without precise locality, *Afzelius! Smeathman! Morson! Hart!* Liberia: Cape Palmas, *Vogel*, 52! Lagos, *Moloney*, 9! Niger Territory: New Calabar, at Degema, *Holland*, 125! Cross River, *Johnston!* Cameroons: Victoria, *Kalbreyer*, 17! Cameroon Mountain, upper slopes, *Johnston*, 97! Bipinde, *Zenker*, 1143! Yaunde, *Zenker & Staudt*, 637! Efulen, *Bates*, 442! Batanga, *Bates!* Fernando Po, *Mann*, 91!

Lower Guinea. Lower Congo: Bingila, *Dupuis!* Angola; Pungo Andongo; in the shady woods of Barranco de Pedra Songue, 3300 ft., *Welwitsch*, 6647!

Also in the West Indies.

The two examples from the West Indies I have seen are probably of one collection, and the locality on the ticket is possibly an error.

47. **C. rufociliata,** *C. B. Clarke.* Hairy. Stems 18 in. long. Leaves 4 by 1 in., elliptic-lanceolate, when mature hairy on both surfaces; base unequal, narrowed above the leaf-sheath, rufous-ciliate. Spathes densely clustered at the ends of the branches, broadly and obliquely funnel-shaped, hairy, varying much in size (in one head from $\frac{1}{2}$ to 1 in. long); margins connate at the base, often for $\frac{1}{3}$–$\frac{1}{2}$ in. Corolla blue. Capsule scarcely $\frac{1}{3}$ in. long, subquadrate, 4-seeded. Seeds hardly longer than broad, small, obscurely reticulate-wrinkled.

Mozamb. Dist. British Central Africa : Nyasaland ; between Mpata and the commencement of the Tanganyika Plateau, 2000–3000 ft., *Whyte !* Kondowe to Karonga, 2000–6000 ft., *Whyte !*

48. **C. longicapsa,** *C. B. Clarke in DC. Monogr. Phan.* iii. 176. Robust, nearly glabrous. Leaves 6 by 2 in., lanceolate-obovate, narrowed at the base into a quasi-petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long. Spathes nearly 1 in. long, glabrous, 2 or 3 together, terminal. Capsule $\frac{1}{3}$ by $\frac{1}{6}$ in., quadrate-oblong, 4-seeded. Seeds cylindric, smooth.—Durand & Schinz, Conspect. Fl. Afr. v. 426.

Lower Guinea. Gaboon : Gaboon River, *Mann !*

The long quasi-petioles, leaves and capsules, show that this fragment indicates some very distinct species.

49. **C. umbellata,** *Thonn. in Schumach. Beskr. Guin. Pl.* 21. Sparingly hairy. Stem 15 in. long, much branched, slender, with internodes 2–3 in. long, at the base decumbent and rooting. Leaves 4 by $\frac{1}{6}$–$\frac{1}{5}$ in. Peduncles scattered, exserted 0–$\frac{1}{3}$ in. from the leaf-sheath. Spathes $\frac{1}{3}$–$\frac{1}{2}$ in. long, broadly ovate, acute, hispid, slightly curved ; margins connate at the base. Flowers purple or white (*Thonning*), or almost flesh-coloured (*Vogel*). Capsule $\frac{1}{6}$ in. long, papery, 3-celled, 3-valved, 3-seeded. Seeds $\frac{1}{8}$ in. long or rather more, ellipsoid, brown, smooth, each with 2 pits on the back.—C. B. Clarke in DC. Monogr. Phan. iii. 179 ; Durand & Schinz, Conspect. Fl. Afr. v. 428 ; K. Schum. in Engl. Pfl. Ost-Afr. C. 135. *C. nigritana,* Benth. in Hook. Niger Fl. 541.

Upper Guinea. Niger Territory : Nupe, *Barter,* 1473 ! Quorra, *Vogel,* 85 !

Mozamb. Dist. German East Africa : Unyamwezi District (ex *K. Schumann*).

50. **C. bracteosa,** *Hassk. in Peters, Reise Mossamb. Bot.* 524. Sparingly hairy. Stems 8–15 in. long, branched ; internodes 2 in. long. Leaves up to $3\frac{1}{2}$ by 1 in., elliptic, acuminate, narrowed at either end. Peduncles 1 (or 2) at the ends of the branches, exserted 0–$\frac{1}{4}$ in. from the leaf-sheaths. Spathes $\frac{2}{3}$ by 1 in., obtusely triangular at the tip, slightly white-hispid ; margins connate at the base. Capsule $\frac{1}{6}$ in. long, papery, 3-seeded. Seeds $\frac{1}{10}$ in. long, subglobose, flattened.—Hassk. in Flora, 1863, 386 ; C. B. Clarke in DC. Monogr. Phan. iii. 180 ; Durand & Schinz, Conspect. Fl. Afr. v. 424 ; K. Schum. in Engl. Pfl. Ost-Afr. C. 135 ; Hua in Bull. Mus. Hist. Nat. Par. i. 119.

Nile Land. British East Africa : Kich District ; at Ador Village, *Petherick !*

Mozamb. Dist. Zanzibar, *Sacleux,* 218. Portuguese East Africa : Mozambique, *Peters ;* Zambesi Delta ; Luabo River, *Kirk,* 32 partly !

51. **C. guineensis,** *Hua in Bull. Mus. Hist. Nat. Par.* i. 119. Root fibrous. Stem branched from the base, glabrescent. Leaves rather long, lanceolate, sessile. Inflorescence terminal, usually 1 only, peduncled. Spathe hooded, not curved, striate, puberulous. Capsule subglobose, with 3 one-seeded cells. Seeds smooth.

Lower Guinea. French Guinea, *Paroisse,* 195 ; Brazzaville, *Thollon,* 961.

Not seen. The above condensed from the description by Hua, who says the species belongs to the Section *Trithyrocarpus*.

52. **C. aspera,** *Benth. in Hook. Niger Fl.* 542. Hairy. Stem 4–6 in. long; internodes up to $1\frac{1}{2}$ in. long. Leaves up to 3 by $\frac{1}{4}$ in., linear or linear-lanceolate. Spathes in a terminal head, $\frac{1}{2}$ in. by $\frac{1}{2}$ in., ovate, acuminate, much curved; margins shortly connate at the base. Capsule small, 3-celled, papery, 3-seeded. Seeds $\frac{1}{10}$ in. long, globose or very shortly ellipsoid, smooth.—C. B. Clarke in DC. Monogr. Phan. iii. 180; Durand & Schinz, Conspect. Fl. Afr. v. 423; Rendle in Cat. Afr. Pl. Welw. ii. 78.

Upper Guinea. Gold Coast: Accra, *Don!* Niger Territory: at the Confluence of the Niger and Benue Rivers, *Vogel!*

53. **C. mensensis,** *Schweinf. in Bull. Herb. Boiss.* ii. *Append.* ii. 57. Leaves 4–5 by $\frac{1}{3}$ in., narrowly linear, rough hairy on the upper surface. Spathes 2 or 3 clustered at the end of the branches, $\frac{3}{4}$ in. long, shortly lanceolate, hispid, striate; margins united at the base for $\frac{1}{5}$ in. Capsule $\frac{1}{4}$ in. in diam.; cells 3, equal, thin, smooth, all dehiscing. Seeds 1 in each cell, globose, $\frac{1}{6}$ in. in diam., smooth, sculptured on either side of the hilum by 4 transverse wrinkles.

Nile Land. Eritrea: below Geleb, 4800–5500 ft., *Schweinfurth*, 1414, 1434; Anseba, near Keren, *Steudner*, 1417.

Not seen; the above condensed from Schweinfurth's description.

54. **C. firma,** *Rendle in Cat. Afr. Pl. Welw.* ii. 78. Hairy. Stems 12–18 in. long, robust; internodes up to 3 in. long. Leaves 3–4 by $\frac{1}{2}$ in., oblong, when mature hairy on both surfaces. Spathes clustered, often many in a terminal head. Seeds $\frac{1}{8}$ in. long. Otherwise nearly as *C. aspera*.—*C. aspera*, var. *β firma*, C. B. Clarke in DC. Monogr. Phan. iii. 180. *Cyanotis hirsuta*, Baker in Trans. Linn. Soc. xxix. 162.

Nile Land. British East Africa: Unyoro; Ukidi Forest, *Speke & Grant!*

Lower Guinea. Angola: Pungo Andongo, 2400–3800 ft.; Pando woods, between Calundo and Mangue, *Welwitsch*, 6644! in shady woods around Pedras de Guinga and Mangue, *Welwitsch*, 6645!

Flowers dark blue (*Welwitsch*), as they probably are in *C. aspera*. This is altogether a much stouter plant than *C. aspera*, with longer capsule and seeds.

55. **C. Vogelii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 189. Sparingly hairy. Stems 1–2 ft. long; internodes 2–5 in. long. Leaves $4\frac{1}{2}$ by $1\frac{1}{8}$ in., elliptic-lanceolate, acute, narrowed at the base. Spathes mostly in clusters of 2 or 3 at the end of the branches, $\frac{1}{2}$–$\frac{2}{3}$ by $\frac{3}{4}$ in., broadly ovate, very shortly acuminate, pubescent, margins shortly connate at the base. Flowers white (*Vogel*). Capsule small, papery, 3-seeded, or sometimes 2-seeded (the dorsal cell being suppressed). Seeds $\frac{1}{12}$–$\frac{1}{10}$ in. long, subglobose, more or less angular.—Durand & Schinz, Conspect. Fl. Afr. v. 428; K. Schum. in Engl. Pfl. Ost-Afr. C. 135; Hua in Bull. Mus. Hist. Nat. Par. i. 120. *C. sulcata*, Benth. in Hook. Niger Fl. 541, not of Willd.

Upper Guinea. Senegambia, *Heudelot*, 476! Senegal, *Bellamy*, 2. Lagos *Millen*, 77! *Rowland!* Fernando Po: in woods, *Vogel*, 261!

Lower Guinea. Angola; Guingongue, *Herb. Paris!*
Mozamb. Dist. British Central Africa: Nyasaland (ex *K. Schumann*)

56. **C. Bainesii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 184. Hairy. Stems 1 ft. long; internodes 2–3 in. long. Leaves 6 by $\frac{2}{3}$ in., narrowly lanceolate, narrowed at the base, with wavy margins, when mature hairy on both surfaces. Peduncles few, scattered towards the end of the branches, exserted 0–$\frac{1}{4}$ in. from the leaf-sheaths. Spathes $\frac{2}{3}$ by $\frac{3}{4}$ in., obtuse or with a very short point, hairy; margins shortly connate at the base. Capsule small, obovoid, trigonous, 3-seeded; dorsal cell similar, indehiscent. Seeds $\frac{1}{12}$ in. in diam., globose, brown, smooth. —Durand & Schinz, Conspect. Fl. Afr. v. 423; Rendle in Cat. Afr. Pl. Welw. ii. 79. *C. bracteosa*, K. Schum. in Engl. Pfl. Ost-Afr. C. 135, partly.

Lower Guinea. Angola: Pungo Andongo, 3300 ft.; in thickets near Ponte de Luxillo, *Welwitsch*, 6636! by streams on the Præsidium near Fonte de Cazella, *Welwitsch*, 6641! in woods near Condo, *Welwitsch*, 6643!

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 2600 ft., *Volkens*, 2147! British Central Africa: Matabeleland; River Mangwe, *Baines!*

Var. *β glabrata*, Rendle in Trans. Linn. Soc. ser. 2, Bot. iv. 52. More glabrous. Mature leaves glabrate; sheaths more or less hairy. Spathes more exserted on peduncles up to $\frac{2}{3}$ in. long, sparsely hispid or glabrous.—Rendle in Journ. Linn. Soc. xxx. 429. *C. angustifolia*, Hassk. in Peters, Reise Mosamb. Bot. 528, and in Flora, 1863, 388, not of Michaux.

Mozamb. Dist. Portuguese East Africa: province of Rios de Sena, *Peters*; Makua; Namuli Mountains, *Last!* British Central Africa: Nyasaland; Mount Mlanji, *Whyte!* Zomba Plains, 2500–3000 ft., *Whyte!* and without precise locality, *Buchanan*, 508! 1374!

All the examples of this variety β have dried brown, unlike the typical *C. Bainesii*, which is greyish, and might be esteemed specifically distinct.

57. **C. lagosensis,** *C. B. Clarke.* Stems 2 ft. or more long, weak, branching, prostrate, rooting at many nodes; internodes 1–3 in. long. Leaves $2\frac{1}{4}$ by 1 in., broadly elliptic, shortly acute, obscurely hairy when mature on both surfaces, suddenly narrowed at the base into a very short quasi-petiole. Peduncles few, scattered, exserted 0–$\frac{1}{4}$ in. from the leaf-sheath. Spathes $\frac{2}{3}$ by $\frac{2}{3}$ in., tip obtuse or depressed triangular, pubescent; margins shortly connate at the base. Capsule small, obovoid, trigonous, 3-celled, 3-seeded; dorsal cell indehiscent. Seeds $\frac{1}{10}$ in. in diam., globose, brown, smooth.

Upper Guinea. Lagos, *Millen*, 21!

58. **C. albescens,** *Hassk. in Schweinf. Beitr. Fl. Aethiop.* 210, 295. Nearly glabrous. Rhizome woody, knotted, with thick roots. Stems 8–20 in. long, branched; internodes 2–3 in. long. Leaves 4 by $\frac{1}{4}$ in., narrowed at both ends. Spathes clustered at the end of the branches, usually 2 or 3 together, $\frac{1}{2}$ in. long, funnel-shaped, very much curved, acute; margins connate for $\frac{1}{4}$ in. at the base. Capsule $\frac{1}{5}$ in. long, 3-celled, 3-seeded, the dorsal cell smaller and indehiscent. Seeds of the ventral cells $\frac{1}{6}$ in. long, ellipsoid, flattened, brown, nearly smooth.—

C. B. Clarke in DC. Monogr. Phan. iii. 184; Durand & Schinz, Conspect. Fl. Afr. v. 423; Hook. f. Fl. Brit. Ind. vi. 373; Martelli, Fl. Bogos. 88; Rendle in Journ. Linn. Soc. xxx. 429; Hua in Bull. Mus. Hist. Nat. Par. i. 120; K. Schum. in Engl. Pfl. Ost-Afr. C. 135, partly. *C. multicaulis*, Hochst. in Schimper, Exsic. 1242. *C. schimperiana*, Hochst. in Schimper, Exsic. 2268.

Upper Guinea. Cape Verde Isles: Brava, *Lowe!* Senegal, *Bellamy*, 573. Dahomey, *Burton!*

Nile Land. Eritrea: Keren; 4800 ft., *Beccari*, 297! Abyssinia: Jaja, *Schimper*, 1242! Agow district; on mountains near Gageros, 4000 ft., *Schimper*, 2268! Somaliland; Ahl Mountains, *Hildebrandt*, 1473! Wagga Mountains, *Mrs. Lort-Phillips!* Boobi, *James & Thrupp!* Witu, *Gregory*. Dadaro, 3700 ft., *Lord Delamere!*

Also in Socotra, Arabia, and Scinde.

Mozamb. Dist. British Central Africa: Nyasaland; Mlanji, 6000 ft., *Whyte*, 112!

59. **C. sphærosperma,** *C. B. Clarke.* Thinly and obscurely hairy. Stems 18 in. long, branched; internodes 2–4 in. long. Leaves 4–5 by $\frac{2}{3}$–1 in., narrowly lanceolate, narrowed at the base, when mature obscurely pubescent on the surfaces or glabrate. Spathes 2–4 together at the ends of the branches, $\frac{2}{3}$–$\frac{3}{4}$ by 1 in., shortly acuminate, acute, not much curved; margins connate for $\frac{1}{5}$ in. at the base. Petals blue when dry. Capsule $\frac{1}{6}$ in. long, obovoid, trigonous, 3-celled, 3-seeded, dorsal cell indehiscent. Seeds of the ventral cells $\frac{1}{10}$ in. long, globose or subcuboid, black-brown, smooth.—*C. Gerrardi*, C. B. Clarke in DC. Monogr. Phan. iii. 183, as to Trop. Afr. examples. *C. albescens*, K. Schum. in Engl. Pfl. Ost-Afr. C. 135, partly; Rendle in Trans. Linn. Soc. ser. 2, Bot. iv. 52.

Mozamb. Dist. Portuguese East Africa: Zambesi Delta; at the mouth of the River Melambe, *Kirk!* Lower Zambesi; between Lupata and Tete, *Kirk!* opposite Sena, *Kirk!* British Central Africa: Nyasaland; Zomba, 2500–3500 ft., *Whyte!*

60. **C. opulens,** *C. B. Clarke.* Nearly glabrous. Stems 4–6 in. long, decumbent, rooting at the base, densely leafy in the upper half with very short internodes. Leaves 4 by $\frac{1}{2}$ in., narrowly oblong-lanceolate, not narrowed on the leaf-sheath. Upper branches for 2 in. clothed with numerous subsessile spathes. Spathes $\frac{2}{3}$ in. long, ovate, shortly acuminate, acute; margins connate at the base. Capsule $\frac{1}{6}$–$\frac{1}{5}$ in. long, obovoid, 3-celled, 3-seeded, the dorsal cell smaller, indehiscent and sometimes sterile. Seeds $\frac{1}{10}$ in. long, very shortly ellipsoid (subglobose), smooth.—*C. aspera*, C. B. Clarke in DC. Monogr. Phan. iii. 180, partly; Rendle in Cat. Afr. Pl. Welw. 78.

Lower Guinea. Angola: Huilla, 3800–5500 ft., among crops of *Penicillaria*, near Humpata, *Welwitsch*, 6592!

Mozamb. Dist. British Central Africa: Nyasaland; Kondowe to Karonga, 2000–6000 ft., *Whyte!*

61. **C. venusta,** *C. B. Clarke.* Sparsely hairy. Branches 10 in. long, undivided, with 1–3 approximated spathes at the end of each

branch; internodes 1–2½ in. long. Leaves 4 by ⅙ in., linear, acuminate, acute. Spathe scarcely exserted from the leaf-sheath, ½–¾ by 1 in., very acute, curved, hairy; margins hardly connate at the base. Petals blue, ⅔ by ¾ in., exclusive of the claw. Capsule small, 3-seeded, the dorsal cell smaller, indehiscent. Seeds $\frac{1}{10}$ in. in diam., globose (somewhat tetrahedral), smooth, brown.

Nile Land. British Somaliland: Golis Range, *Miss Edith Cole!*

Separate expanded flowers have been carefully dried; they must be unusually large and bright. The stamens, barren and fertile, are just as those of *C. nudiflora*, Linn. (and numerous other species), but larger.

62. **C. Livingstoni,** *C. B. Clarke in DC. Monogr. Phan.* iii. 190. Nearly glabrous, or somewhat hairy. Stems 1–2 ft. long, sometimes robust, suberect from a stout base, straggling, branched; internodes 2–5 in. long. Leaves 5½ by ⅓ in., lanceolate, narrowed at either end. Peduncles 1 (or 2, rarely 3, close together) at the end of a branch, hardly longer than the leaf-sheaths. Spathes attaining 1 by 1¼ in., shortly acuminate, acute, nearly glabrous; margins connate for ¼–⅓ in. at the base. Petals blue. Capsule ⅕ in. long, obovoid compressed, 2-seeded. Seeds ⅙ in. long, ellipsoid, brown, smooth.—Dyer, Fl. Cap. vii. 11; Durand & Schinz, Conspect. Fl. Afr. v. 426.

Nile Land. British East Africa: Witu; Mkanumbi, *Gregory!* Rabai Hills, near Mombasa, *Taylor.*

Mozamb. Dist. German East Africa: Kilimanjaro, 5000 ft., *Johnston!* Portuguese East Africa: Zambesi Delta; near Vicente, *Scott!* Lower Zambesi; between Lupata and Sena, *Kirk!* between Lupata and Tete, *Kirk!* Tete, *Kirk!* near Sena, *Kirk!* Lower Shire Valley; near the foot of Morambala Mountain, *Kirk!* Matabeleland, *Elliott!*

Also in South Africa.

63. **C. Zenkeri,** *C. B. Clarke.* Sparsely hairy. Stems cæspitose from a stout base, up to 12 in. long, branched, decumbent and rooting at the lower nodes; internodes up to 3 in. long but mostly short. Leaves 2 by 1–1¼ in., ovate, shortly acute, suddenly narrowed at the base, sessile. Peduncles solitary, few, scattered, exserted 0–⅙ in. from the leaf-sheaths. Spathes ½–⅔ by 1 in., hardly acute, minutely pubescent or glabrate; margins very shortly connate at the base. Petals blue when dry. Capsule ⅕ in. long, quadrate, compressed, 2-seeded. Seeds nearly ⅙ in. long, ellipsoid, smooth.

Upper Guinea. Cameroons: Yaunde, 2600 ft., *Zenker & Staudt*, 432!

Distributed from Berlin Herbarium as *C. æthiopica*, C. B. Clarke; but it is not that species.

64. **C. æthiopica,** *C. B. Clarke in DC. Monogr. Phan.* iii. 189. Nearly glabrous. Stems 8–14 in. long, suberect, cæspitose, thick at the base; internodes 1–2½ in. long. Leaves 3½ by ¾–1 in., broadly oblong-lanceolate, narrowed at the base into a very short pseudo-petiole. Peduncles solitary or 2 at the end of a branch, hardly longer than the leaf-sheath. Spathes ¾ by 1 in., acute, hardly acuminate, sparsely

white-hispid; margins shortly connate at the base. Flowers deep blue (*Schweinfurth*). Capsule $\frac{1}{6}$ in. long, 2-seeded. Seeds $\frac{1}{8}$ in. long, subglobose, smooth.—Durand & Schinz, Conspect. Fl. Afr. v. 189.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2027! Kurshook-Ali's Seriba, *Schweinfurth*, 1601!

This may prove to be only a 2-seeded form of *C. bracteosa*; it has larger leaves, smaller capsule and seeds. More material of both species is desirable.

65. **C. pyrrhoblepharis,** *Hassk. in Schweinf. Beitr. Fl. Aethiop.* 209, 295. Stems 2 ft. long (at least), rooting freely by stout roots from the lower nodes; internodes up to 4 in. long, robust, glabrate. Leaves attaining $5\frac{1}{2}$ by 2 in., broadly elliptic, acuminate, when mature minutely pubescent, unequally and rather suddenly narrowed at the base into a quasi-petiole 0–$\frac{1}{4}$ in. long; leaf-sheaths often with long rufous hairs at the mouth. Spathes 2 or 3, near together at the ends of the branches, hardly exserted from the leaf-sheaths, $\frac{2}{3}$–$\frac{3}{4}$ in. long, very broadly ovate, shortly acute, slightly hairy; margins connate at the base for $\frac{1}{3}$ in. Flowers blue. Capsule small, 2-seeded. Seeds $\frac{1}{12}$ in. long, round-ellipsoid, smooth.—C. B. Clarke in DC. Monogr. Phan. iii. 190; Engl. Hochgebirgsfl. Trop. Afr. 155; Durand & Schinz, Conspect. Fl. Afr. v. 427. *C. acuminata*, R. Br. in Salt, Abyss. Append. 63, name only, not of H. B. K. *C. saltiana*, Steud. Nomencl. Bot. ed. ii. 402.

Nile Land. Abyssinia: Lotho, 7000–8000 ft., *Schimper*, 591! 1591! Mount Sholoda, 6700 ft., *Schimper*, 341; Adowa, *Quartin-Dillon & Petit*. Gondar, *Rochet d'Héricourt!* and without precise locality, *Plowden!*

Hasskarl does not describe the capsule, nor does he cite the number of Schimper he had. So far as his description goes of the large leaves with red hairs at the mouth of the leaf-sheaths and turbinate clustered spathes, his plant might have been the large state of *C. benghalensis*, which Schimper, 1591, closely resembles. The species really stands on the assumption that Plowden's examples (which contained one capsule) are truly conspecific with Schimper, 1591.

66. **C. obscura,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 135. Hairy, small. Stems 4–6 in. long, weak, branched, annual, rooting at the lower nodes; internodes 1–$1\frac{1}{2}$ in. long. Leaves $1\frac{1}{4}$ by $\frac{1}{2}$ in., elliptic-oblong, shortly acute, when mature hairy on both surfaces; leaf-sheaths with long spreading red hairs. Spathes $\frac{1}{4}$–$\frac{1}{3}$ in. long, solitary, on very short peduncles, ovate, hardly acute. Petals blue or rarely violet (*K. Schumann*). Capsule $\frac{1}{6}$ in. long, quadrate, 2-seeded. Seeds subglobose, somewhat wrinkled.

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 5000 ft., *Volkens*, 2267! 633!

K. Schumann has referred this plant to the Section *Dissecocarpus*, but I find only 2 seeds to the capsule.

Imperfectly known species.

67. **C. grossa,** *C. B. Clarke.* Nearly glabrous. Stems 6–10 in. long, erect, bearing 1 or 2 leaves and 1 peduncle. Leaves up to 14 by

$\frac{1}{4}$–$\frac{1}{3}$ in., linear, slightly dilated at the very base. Peduncle exserted $\frac{1}{2}$–2 in. from the leaf-sheath. Spathe $1\frac{1}{3}$ in. long, $1\frac{1}{2}$ in. broad, ovate-triangular, acute, purple-green; margins free. Cymes paired in each spathe, upper with many flowers. Sepals $\frac{1}{5}$ in. long, elliptic, nearly free. Corolla in the dried state purple-blue.

Mozamb. Dist. British Central Africa: Kambole, south-west of Lake Tanganyika, 5000 ft., *Nutt !*

The examples of this call to mind the large Mexican *C. elliptica*, H. B. & K., but the leaves are totally unlike.

68. **C. Holubii,** *C. B. Clarke.* Nearly glabrous. Stems 5 in. long, with 2 leaves and 1 spathe each. Leaves 4 by $\frac{1}{6}$–$\frac{1}{7}$ in., linear, slightly wider at the base. Peduncles exserted $\frac{3}{4}$–1 in. from the leaf-sheath, nearly glabrous. Spathe $\frac{3}{4}$ in. by $\frac{2}{3}$ in., ovate-lanceolate, acute, very nearly glabrous, pale yellow-brown in the dried examples; margins free or obscurely connate at the base. Flowers numerous, some exserted entirely from the spathe. Petals $\frac{1}{3}$ in. long, appear to have been pale violet. Two fertile anthers intensely blue in the dried state. Capsule about $\frac{1}{4}$ in. long, square, 4-seeded.

Mozamb. Dist. British Central Africa: Rhodesia; Leshumo Valley, *Holub* 715 !

From the imperfect capsule, this almost certainly belongs to the Section *Dissecocarpus*.

69. **C. senegalensis,** *Linn. ex Cat. Ort. Bot. Napol.* 1845, 22 (*name only*); *Durand & Schinz, Conspect. Fl. Afr.* v. 429.

Upper Guinea. Senegal?

4. **POLYSPATHA,** Benth.; Benth. et Hook. f. Gen. Pl. iii. 849.

Sepals 3, small, concave. Petals 3, white, 2 very long-clawed. Stamens 3 fertile, 3 sterile with dissimilar rudimentary anthers. Ovary sessile, 2-celled, with one ovule in each cell. Capsule 2-celled, loculicidally 2-valved. Seeds half-ellipsoid; hilum vertical; embryostega opposite the hilum.—Cymes few-flowered, scattered along simple (rarely branched) elongate axes springing from the axils of the upper leaves and sometimes piercing their sheaths; spathes ovate, folded flat, sessile, each enclosing one cyme.

Endemic, monotypic.

1. **P. paniculata,** *Benth. in Hook. Niger Fl.* 543. Stem 1–$2\frac{1}{2}$ ft. long, trailing or weak, often rooting at the lower nodes, undivided but in one example throwing several weak stems from the rooting node. Leaves 6 by $2\frac{1}{2}$ in., broadly elliptic, acuminate at either end, quasi-petioled, glabrate above, pubescent beneath; lower leaves smaller, sometimes reduced to sheaths. Panicle of 1–6 branches, each 3–6 in. long, pubescent; spathes $\frac{1}{2}$ in. long, about $\frac{1}{2}$ in. apart, pendent in fruit.

Flowers 4–5 in each spathe; bracteoles small. Capsule $\frac{1}{8}$ in. long, flattened, shining, obtuse at the apex. Seeds with ribs radiating from the embryostega.—C. B. Clarke in DC. Monogr. Phan. iii. 194, incl. var. β; Durand & Schinz, Conspect. Fl. Afr. v. 429, incl. var. β; Schoenl. in Engl. & Prantl, Pflanzenfam. ii. iv. 64; Baill. Hist. Pl. xiii. 221.

Upper Guinea. Sierra Leone: near Kukuna on the River Scarcies, *Scott-Elliot*, 4678! Ashanti: Assin-Yan-Coomassie, *Cummins*, 163! Lagos: by the side of forests on the road to Otto, *Millen*, 4! Otto, *Millen*, 26! Lagos Botanic Station, *Millen*, 7! Cameroons: Yaunde, 2600 ft., *Zenker & Staudt*, 566! Bipinde, *Zenker*, 1239! Efulen, *Bates*, 447! Cameroon Mountain, 3000 ft., *Mann*, 2138! and without precise locality, *Preuss*, 1186! Fernando Po, *Vogel*, 93! *Barter*, 1474! 2055! *Mann!*

5. **ANEILEMA**, R. Br., partly; Benth. et Hook. f. Gen. Pl. iii. 849.

Sepals 3, small, elliptic or ovate, obtuse, concave. Petals 3, obovate, blue or yellow. Stamens 3 (or 2) fertile, the intermediate one with more or less dissimilar anther, and 3–2 sterile, rudimentary or cruciform; filaments with or without beaded hairs. Ovary 3–2-celled. Capsule ovoid to linear, 3-valved; seeds several (or 2–1) superposed in one vertical row (in the Tropical African species) in each cell.—Panicles dense or lax; peduncles simple or divided; cymes simple, 1-sided; bracts to the cymes flat or hardly folded, never spathaceous (as in *Commelina*).

Species 60, tropical or subtropical, whereof 5 only are American.

The genus differs from *Commelina* in the absence of the strongly folded or hooded bracts which enfold the cymes in *Commelina*.

*TRICARPELLARIA.—Capsule subequally 3-celled. Cells 2-seeded, acute, in the African species. Inflorescence dichotomous . . . . . 1. *A. sinicum.*

**DICARPELLARIA.—Capsule 2-celled; a dorsal small cell with 1 (or no) seed sometimes added.

†*Amelina*.—Panicles terminal. Capsule truncate, with 2 acute corners.

Sepals $\frac{1}{5}$–$\frac{1}{3}$ in. long.

Capsule with 3–5 seeds in each cell . . . 2. *A. æquinoctiale.*

Capsule with 2–1 seeds in each cell . . . 4. *A. nyasense.*

Sepals $\frac{1}{8}$ in. long . . . . . 3. *A. tacazzeanum.*

††*Lamprodithyros*.—Panicles terminal. Capsule ellipsoid without angles at the top.

Petals yellow or green-yellow.

Panicle short, hardly exserted from the leaves . 5. *A. angolense.*

Panicle peduncled; cyme-peduncles in false-whorls . . . . . 6. *A. Johnstoni.*

Petals (where known) blue to white.

Ovules often 3 in each cell.

Leaves ovate or elliptic; panicle dense . . 7. *A. beniniense.*

Leaves lanceolate; panicle lax . . . 8. *A. Rendlei.*

Ovules 2–1 in each cell.

Leaves ovate to elliptic-oblong (see also 16. *Welwitschi*).

Inflorescence very loose . . . . 9. *A. ovato-oblongum.*
Inflorescence dense.
Leaves sessile, base rounded.
Medium-sized plant; leaves up to $2\frac{3}{4}$ in. long . . . . . 10. *A. somaliense.*
Plant 5 in. high; leaves up to $1\frac{1}{8}$ in. long . . . . . 11. *A. Smithii.*
Base of leaves acuminate into a pseudo-petiole.
Panicle glabrate . . . . 12. *A. dregeanum.*
Panicle patently hispid . . . 13. *A. Nicholsoni.*
Leaves lanceolate-oblong to linear (sometimes elliptic in *A. Welwitschii*).
Inflorescence lax . . . . . 14. *A. Petersii.*
Inflorescence dense.
Stem erect at the base; roots thick.
Flowering stem with few reduced leaves 15. *A. Schweinfurthii.*
Flowering stem with many well-developed leaves.
Minutely pubescent . . . 16. *A. Welwitschii.*
Hispid . . . . . 17. *A. soudanicum.*
Stem decumbent or rooting at the lower nodes; roots fibrous.
Many pedicels sterile, ended by a black rudiment . . . . . 18. *A. Whytei.*
Sterile pedicels none (or very few occasionally).
Leaves linear-lanceolate, very long . 19. *A. lanceolatum.*
Leaves lanceolate . . . . 20. *A. Spekei.*
Leaves linear, hardly 2 in. long . 21. *A. gracile.*

†††*Pseudo-axillares.*—Panicles appearing irregularly scattered, all terminal, but not rarely on remote short axillary branches.
Leaves 1–2 in. long.
Inflorescences of very many flowers . . . 22. *A. pedunculosum.*
Inflorescences of about 8 flowers . . . . 23. *A. Clarkei.*
Leaves at most $\frac{2}{3}$ in. long . . . . . 24. *A. Taylori.*

1. **A. sinicum,** *Lindl. in Bot. Reg. t.* 659. Nearly glabrous. Roots occasionally bearing tubers. Stems 1–3 ft. long, sparingly leafy. Leaves linear, 8–18 by $\frac{1}{6}$–$\frac{1}{4}$ in. (but see var. *β*). Panicle-branches elongated, slender, subracemose; bracts $\frac{1}{2}$–2 in. long, linear-lanceolate, flat; cymes usually thin, loose, but sometimes the inflorescence is dense with numerous flowers; lower flowers of the cyme often sterile, early caducous, so that the top of the cyme-peduncle appears knotted. Sepals $\frac{1}{6}$ in. long, elliptic, obtuse, half-petaloid in texture. Petals $\frac{1}{4}$ in. long and upwards, blue, or sometimes dull purple. Stamens 2 only fertile (but see var. *β*). Capsule $\frac{1}{6}$–$\frac{1}{5}$ in. long, 3-valved; seeds normally 2 in each cell, obscurely wrinkled.—C. B. Clarke in DC. Monogr. Phan. iii. 212, and in Dyer, Fl. Cap. vii. 12; Oliv. in Trans. Linn. Soc. ser. 2, Bot. ii. 352; Durand & Schinz, Consp. Fl. Afr. v. 432; Durand & Schinz, Études Fl. Congo, i. 271; K. Schum. in Engl. Pfl. Ost-Afr. C. 136; Durand & De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 87, and in Bull. Soc. bot. Belg. xxxvii. 128; Rendle in Journ. Linn.

Soc. xxx. 430, in Trans. Linn. Soc. ser. 2, Bot. iv. 52, and in Cat. Afr. Pl. Welw. ii. 79; Hua in Bull. Mus. Hist. Nat. Par. i. 120. *Commelina sinica*, Roem. et Schultes, Mant. i. Addend. i. 376.

Upper Guinea. Sierra Leone; Bumban to Port Lokko, *Scott-Elliot*, 5742!

North Central. French Congo: Uaddas, on the Ubangi River, *Dybowski*, 26B.

Nile Land. British East Africa: Jur; Agad Seriba (Wau), *Schweinfurth*, 1684! Ruwenzori, below 6000 ft., *Scott-Elliot*, 6673! Leikipia district, at Guaso Thegu and Kithungulu, *Gregory!* Ukamba, above 4000 ft., *Scott-Elliott*, 2340! Ribe to Galla Country, *Wakefield!* Nyika Country at Duruma, *Wakefield*, 26! Rabai Hills, near Mombasa, *Taylor!*

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 341! French Congo; Franceville, *Thollon*, 314; Brazzaville, *Dybowski*; Bangui, *Dybowski*, 525–529; Lower Congo: Lukungu, *Hens*, 228A! Bingila, *Dupuis!* Stanley Pool, *Büttner*, 305! Quiballa, *Monteiro!* Angola; Pungo Andongo, in marshes to the west of the Præsidium, and by streams in the Præsidium itself, 2400–3800 ft., *Welwitsch*, 6627! 6628! Huilla; marshy places round the base of Morro de Lopollo, 3800–5500 ft., *Welwitsch*, 6591! Dammara-land, *Een!*

South Central. Congo Free State: Bolobo, on the River Congo, *Johnston!* Upper Marungu, *De Beerst!* Lualaba River, *Briart!* Katanga, *Briart!* Mussima, *Briart!*

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1055! *Sacleux*, 406! German East Africa: Kilimanjaro, 5000 ft., *Johnston!* Rovuma Bay, *Kirk!* Portuguese East Africa: Zambesi Delta; mouth of the West Luabo River, *Kirk*, 2! British Central Africa: Urungu; Fwambo, *Carson*, 43! 76! 77! Kambole, south-west of Lake Tanganyika, 5000 ft., *Nutt!* Nyasaland; Kondowe to Karonga, 2000–6000 ft., *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!* Mount Zomba, 4000–6000 ft., *Whyte!* Zomba and vicinity, 2500–3500 ft., *Whyte!* Mount Mlanji, *Whyte*, 39! and without precise locality, *Buchanan*, 368!

Also in South China, Malaya, South India, Mascarene Islands, and South Africa.

Var. β *longifolia*, C. B. Clarke. Rather larger in all parts; leaves often $\frac{1}{4}$–$\frac{1}{3}$ in. broad; fertile stamens commonly 2, but sometimes 3.—*A. longifolium*, Hook. Exot. Fl. iii. t. 204; Baker in Trans. Linn. Soc. xxix. 163. *A. giganteum*, as to the African plants, C. B. Clarke in DC. Monogr. Phan. iii. 212; Durand & Schinz, Consp. Fl. Afr. v. 430; K. Schum. in Engl. Pfl. Ost-Afr. C. 136.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 1840! Niamniam; by the River Sway, *Schweinfurth*, 3904!

Lower Guinea. Cameroons: Batanga, *Bates*, 120!

Mozamb. Dist. Zanzibar, *Bojer!* Lake Tanganyika, *Carson!* German East Africa: Unyamwezi; near Tabora, in swamps, 3000 ft., *Speke & Grant!* Usambara, *Holst*, 2962! Portuguese East Africa: Zambesi Delta; Luabo River, *Kirk*, 50! River Shire, near Morambala Mountain, *Kirk!* British Central Africa: Nyasaland; without precise locality, *Buchanan*, 1335! 1363! Rhodesia: Six-mile Spruit, near Salisbury, *Hon. Mrs. Evelyn Cecil*, 148!

This series of plants runs without a break into the typical form. It was attempted, in DC. Monogr. Phan. iii. 212, to separate *A. giganteum* with 3 fertile stamens specifically from *A. sinicum* with 2 fertile stamens. Hooker says that his *A. longifolium* had 2 or 3 fertile stamens; and I do not find that the Indian *A. giganteum* has always 3. I think the number of fertile stamens is not absolute, and that all the African plants cited under *A. sinicum*, var. *longifolia*, are one species. The Indian *A. giganteum* differs very little; it is rather more robust, with thicker branches to the panicle.

Var. *simplex*, C. B. Clarke in DC. Monogr. Phan. iii. 212. Leaf-sheaths shaggy.

Panicle small. Capsule depressed, as broad as long. Durand & Schinz, Consp. Fl. Afr. v. 432. *A. simplex*, Kunth, Enum. iv. 71; Benth. in Hook. Niger Fl. 547. *Commelina simplex*, Vahl, Enum. ii. 177; Thonn in Schumacher, Beskr. Guin. Pl. 22.

Upper Guinea. Gold Coast: Accra, *Don!*

This may represent a distinct species, but the material is small.

2. **A. æquinoctiale,** *Kunth, Enum.* iv. 72. Hairy, sometimes hispid or viscous. Stems 2–8 ft. long. Leaves often 4 by 1 in., sometimes 7 by $1\frac{3}{4}$ in., elliptic or lanceolate, the lower attenuated, the upper often ovate at the base. Panicle terminal, often 5 by 2–3 in., rigid, loose; the cyme-peduncles in distant false-whorls or less often alternate; bracts at their base $\frac{1}{6}$–$\frac{1}{3}$ in. long, oblong; empty bracts on the lower part of the cyme-peduncles hardly $\frac{1}{8}$ in. long, ovate or obovate; pedicels $\frac{1}{4}$–$\frac{2}{3}$ in. long. Sepals $\frac{1}{4}$ in. long and upwards, oblong, not acute. Petals yellow, blue, mauve, or lilac. Fertile stamens 2 or 3. Capsule $\frac{1}{3}$ by $\frac{1}{5}$ in., 2-celled with a dorsal small or imperfect cell sometimes added, truncate at the top, the two upper angles acute or minutely horned; seeds 3–5 in each cell, pale, stony.—C. B. Clarke in DC. Monogr. Phan. iii. 221, incl. all the vars., and in Dyer, Fl. Cap. vii. 12; Oliver in Trans. Linn. Soc. ser. 2, Bot. ii. 352; Durand & Schinz, Conspect. Fl. Afr. v. 429, and Études Fl. Congo, i. 270; Schoenl. in Engl. & Prantl, Pflanzenfam. ii. iv. 65; Durand & De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 87; K. Schum. in Engl. Pfl. Ost-Afr. C. 136; Rendle in Journ. Linn. Soc. xxx. 430, in Trans. Linn. Soc. ser. 2, Bot. iv. 52, and in Cat. Afr. Pl. Welw. ii. 79; Hua in Bull. Mus. Hist. Nat. Par. i. 120; Cummins in Kew Bulletin, 1898, 80. *A. adhærens*, Kunth, Enum. iv. 72. *A. tacazzeanum*, A. Rich. Tent. Fl. Abyss. ii. 343, not of Hochst. *Commelina æquinoctialis*, Beauv. Fl. Owar. i. 65, t. 38. *Lamprodithyros æquinoctialis*, Hassk. in Schweinf. Beitr. Fl. Aethiop. 211. *L. adhærens*, Hassk. in Schweinf. Beitr. Fl. Aethiop. 211. *Amelina Wallichii*, C. B. Clarke, Comm. et Cyrt. Beng. t. 26.

Upper Guinea. Ashanti: Dumassi, *Cummins*, 19! Western Lagos, *Rowland!* Lagos, *Punch!* Old Calabar River, *Mann*, 2338! Cameroons: Efulen, *Bates*, 376.

Nile Land. British East Africa: Uganda, *Scott-Elliot*, 7263! Ukamba; Kitui, *Hildebrandt*, 2641! Taita: Maungu Mountain, 2000 ft., *Johnston!* Ribe, near Mombasa, *Wakefield!* Nyika Country, near Mombasa, *Wakefield!* Fimbine, near Rabai, *Taylor!*

Lower Guinea. Loango: Chinchocho, *Soyaux*, 19! Landana, *Du Parquet.* French Congo: Brazzaville, *Brazza*, 313, *Thollon*, 957, *Dybowski.* Lower Congo: Lukungu, *Hens*, A, 272! Bingila, *Dupuis!* Congo, *Smith*, 52! 58! *Burton!* Angola: 30 miles inland to Bembe, *Monteiro!* Golungo Alto; banks of the River Delamboa, *Welwitsch*, 6605!

South Central. Monbuttu: near Bongwa, *Schweinfurth*, ser. iii. 215!

Mozamb. Dist. Zanzibar, *Grandidier*, 28. German East Africa: Usambara; Lutindi, *Holst*, 3451! Tanga, *Holst*, 2107! Kilimanjaro, 6000 ft., *Johnston!* Portuguese East Africa: Beira Railway, *Hon. Mrs. Evelyn Cecil*, 5! Lower Zambesi; near Sena, *Kirk!* Tete Hill, *Kirk!* Shupanga, *Kirk!* Shamo, near the mouth of the River Shire, *Kirk!* Morambala Mountain, 2000 ft., *Kirk!* British Central Africa: North Nyasaland and Upper Loangwe River, *Nicholson!* Nyasaland: Nyika Plateau, 6000–7000 ft., *Whyte!* Mount Mlanje, *Whyte*, 131! Mount Zomba and vicinity, 2500–3500 ft., *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!* Shire Highlands,

Buchanan, 286! Mount Sochi, *Scott-Elliot*, 8527! Manganja Hills, *Waller!* Mount Chiradzulu, *Meller!* and without precise locality, *Buchanan*, 459! 510! 528! 1401! Matabeleland, *Elliott!* Salisbury to Buluwayo, *Hon. Mrs. Evelyn Cecil*, 81!

Also in South Africa, the Mascarene Islands, and Arabia.

Schimper, 1660, contains, by admixture, both *A. æquinoctiale* and *A. tacazzeanum*. A. Richard describes therefrom his *A. tacazzeanum* as having six seeds to each cell of the capsule, so that his plant was certainly *A. æquinoctiale*, Kunth. *Lamprodithyros tacazzeanus*, Hassk. in Peters, Reise Mossamb. Bot. 531, is said to be *Aneilema tacazzeanum*, Walp. Ann. iii. 658, which is merely copied, with a little confusion, from A. Richard; but Hasskarl describes his *Lamprodithyros tacazzeanus* at great length, and says the ovules were only 2–1 in each cell; so that Hasskarl's plant was really the *tacazzeanus* of Hochstetter, excluding the citation of Walpers. There is ample evidence of the variation in the colour of the petals; the different-coloured flowers have been esteemed different species by many collectors.

3. **A. tacazzeanum,** *Hochst. ex C. B. Clarke in DC. Monogr. Phan.* iii. 222, *not of A. Rich.* Thinly hairy. Stems 1–2 ft. long, weak, decumbent at the base and there sometimes divided, rooting often at the lower nodes. Leaves 3 by 1 in. (in Hochstetter's two "types"), elliptic, acute, base contracted, often subpetioled. Inflorescence terminal, peduncled, $1\frac{3}{4}$ by $1\frac{1}{2}$ in., very lax, obscurely pubescent; cyme-peduncles alternate; bracts less than $\frac{1}{8}$ in. long, ovate; bracteoles less than $\frac{1}{8}$ in. long, obovate. Sepals about $\frac{1}{8}$ in. long, elliptic, concave. Corolla smaller than in *A. æquinoctiale*, appears to have been yellow. Ovules 3–2 in each cell. Capsule nearly $\frac{1}{3}$ by $\frac{1}{6}$ in., white, truncate, with the two upper angles acute, mostly 2-celled, with 3–1 seeds in each cell.—Durand & Schinz, Conspect. Fl. Afr. v. 432; K. Schum. in Engl. Pfl. Ost-Afr. C. 136. *A. Forskalæi*, Schweinf. in Bull. Herb. Boiss. ii., Append. ii. 58, not of Kunth. *Lamprodithyros tacazzeanus*, Hassk. in Peters, Reise Mossamb. Bot. 531 (excl. the syn. of Walpers), and in Schweinf. Beitr. Fl. Aethiop. 295. Cfr. DC. Monogr. Phan. iii. 222.

Nile Land. Eritrea: Gorge of Ailet, *Schweinfurth & Riva*, 427! below Geleb, 5000 ft., *Schweinfurth*, 1416, 1788; Ginda, 3250 ft., *Schweinfurth*, 128, 392. Abyssinia: Valley of the River Tacazze, *Schimper*, 1660, 1729! *Quartin-Dillon & Petit*, 449!

This is a much weaker plant than *A. æquinoctiale*, the capsule smaller, with often only 2–1 seeds in each cell. The example of Schweinfurth, 427, is much stouter than Schimper's, with larger inflorescence and 3 seeds to each cell; this is separated from the smaller examples of *A. æquinoctiale* by the smaller, more concave elliptic sepals. Hua (in Bull. Mus. Hist. Nat. Par. i. 121) appears to draw the line between the two species at a different point.

Schweinfurth reduces here *A. Ehrenbergii*, C. B. Clarke (which see No. 27 below), and *A. Forskalæi*, Kunth. The latter is fully described as *Commelina paniculata* by Vahl (Enum. ii. 179), who appears to have had Forskal's plant; and who describes inter alia "peduncles lateral and terminal, paired, with a sheath $\frac{1}{2}$ in. long at the base of each"; so that this plant must have been very remote from *A. tacazzeanum*, and was almost certainly a species of *Commelina*.

4. **A. nyasense,** *C. B. Clarke.* Pubescent. Portion of stems seen 1 ft. long, unbranched. Leaves 3 by 1 in., elliptic, acute. Panicle terminal, 5 by $2\frac{1}{2}$ in., loose; cyme-peduncles mostly in distant false-

whorls, the bracts at their base $\frac{1}{5}$ in. long, elliptic; one or two of the lower cyme-peduncles supported sometimes by a leaf $2\frac{1}{4}$ in. long. Cyme-peduncles glabrate; several of the lower bracteoles empty, $\frac{1}{8}$–$\frac{1}{6}$ in. long, ovate; pedicels in fruit $\frac{1}{3}$–$\frac{2}{3}$ in. long. Sepals nearly $\frac{1}{4}$ in. long, narrowly elliptic, glabrate. Capsule $\frac{1}{5}$ in. long, truncate, with acute angles at the top; seeds 2–1 in each cell.

Mozamb. Dist. British Central Africa: Nyasaland; 2000–6000 ft., Kondowe to Karonga, *Whyte*, 337!

This species is close to the small examples of *A. æquinoctiale*, but has broader sepals, and not more than 2 seeds to each cell of the capsule.

5. **A. angolense,** *C. B. Clarke.* Sparsely hairy. Stems $2\frac{1}{3}$–3 ft. long, with long internodes, and branches from most axils. Leaves 3 by $\frac{1}{3}$ in., broadly ovate, acute, narrowed at the base almost into a quasi-petiole; the uppermost large and folded. Inflorescence sessile on the upper leaves, and shorter than they, of several lax panicles (i.e. of one panicle divided at the very base); an axillary panicle is added in one example. Bracts very small; no ovate small empty bracts seen. Pedicels of the fruit $\frac{1}{6}$ in. long. Flowers green, the lower petal yellowish (*Welwitsch*). Capsule $\frac{1}{5}$ by $\frac{1}{6}$ in., papery, shining, 2-celled, 4-seeded. —*A. Ehrenbergii*, Rendle in Cat. Afr. Pl. Welw. ii. 79.

Lower Guinea. Angola: Golungo Alto; in woods on the mountains of Alto Queta, 1000–2400 ft., *Welwitsch*, 6610!

A description of this plant is given in DC. Monogr. Phan. iii. 230, where it is supposed that it may be *Lamprodithyros Ehrenbergii*, Hassk., an Abyssinian plant, which probably differs, cfr. No. 27 below.

Var. *magis-lutea*, C. B. Clarke. Stems slenderer, 6–14 in. long. Leaves smaller, attaining $2\frac{1}{4}$ by $1\frac{1}{8}$ in. Panicle depauperated, lax, few-flowered. Sepals green (*Welwitsch*). Petals 2 yellow, 1 green or yellow (*Welwitsch*).—*A. pedunculosum*, var. *lutea*, C. B. Clarke in DC. Monogr. Phan. iii. 228; Durand & Schinz, Conspect. Fl. Afr. v. 431; Rendle in Cat. Afr. Pl. Welw. ii. 79.

Lower Guinea. Angola: Pungo Andongo; 2400–3800 ft., in shade on the rocky heights of Pedras de Guinga, *Welwitsch*, 6630! on the rocks of the Præsidium, *Welwitsch*, 6649!

The habitat, the colour of the flowers twice noted by Welwitsch, the lax panicle, the tendency to produce short branches from the leaf axils all tend to show that this plant is nearer to *A. angolense* than to *A. pedunculosum*.

6. **A. Johnstonii,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 135. Thinly hairy. Stems 18 in. long, not rarely branched. Leaves up to 4 by $\frac{2}{3}$–$\frac{3}{4}$ in., lanceolate. Panicle terminal, peduncled, $3\frac{1}{2}$ by $1\frac{3}{4}$ in., open, nearly glabrous, erect; cyme-peduncles in apparently distant whorls; bracts hardly $\frac{1}{6}$ in. long; pedicels attaining $\frac{1}{4}$–$\frac{1}{3}$ in.; bracteoles scarcely $\frac{1}{10}$ in. long, ovate or obovate. Sepals $\frac{1}{6}$ in. long, roundly elliptic, obtuse. Petals 2, yellow, the odd one a brown-yellow. Capsule $\frac{1}{5}$ by $\frac{1}{6}$ in., broadly ellipsoid, very obtuse at the top, but without horns at the corners; seeds usually 2 in each cell.—*Aneilema*, cfr. *lanceolatum*, Oliver in Trans. Linn. Soc. ser. 2, Bot. ii. 352.

Mozamb. Dist. German East Africa: Kilimanjaro; Lower slopes, 2000–3000 ft., *Johnston!* below Maraugu, 2600 ft., *Volkens*, 2146! Usambara; Pare

Mountains, *Hoehnel*, 159. British Central Africa: Rhodesia; on the road from Missala to Luia River, *Nicholson!* Nyasaland; Shire Highlands, *Buchanan*, 435.

Oliver regarded this as belonging to the sect. *Lamprodithyros;* K. Schumann transferred it to sect. *Eu-Aneilema.*

7. **A. beniniense,** *Kunth, Enum.* iv. 73. Stem trailing 1–2 ft. long, rooting near the base; the axillary shoots sometimes boring through the base of the leaf-sheaths. Leaves 2–5 in. long, ovate elliptic or oblong, acuminate, very slightly hairy, upper much less narrowed at the base than the lower. Inflorescence usually of 1 (or 2) terminal peduncled dense nearly glabrous panicles 2 by $1\frac{1}{2}$ in.; the cyme-peduncles often 100 or more, spreading at right angles; bracts inconspicuous; bracteoles minute, obovate; the inflorescence is sometimes evolute into a mass 7 by 2 in. of a number of congested panicles. Flowers very small, blue or whitish. Sepals about $\frac{1}{10}$ in. long, thin, ovate, concave. Fertile stamens (at least often) 3; filaments without hairs. Capsule $\frac{1}{4}$ by $\frac{1}{6}$ in., shining, thin in texture, not truncate, normally 7–5-seeded. Seeds pale, stony.—Benth. in Hook. Niger Fl. 546; C. B. Clarke in DC. Monogr. Phan. iii. 224; Durand & Schinz, Conspect. Fl. Afr. v. 430, and Études Fl. Congo, i. 270; Durand & De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 87; K. Schum. in Engl. Pfl. Ost-Afr. C. 136; Hua in Bull. Mus. Hist. Nat. Par. i. 121, incl. var. *oxycarpa;* Rendle in Cat. Afr. Pl. Welw. ii. 79; Cummins in Kew Bulletin, 1898, 80. *Commelina beniniensis*, Beauv. Fl. Owar. ii. 49, t. 87. *Lamprodithyros beniniensis?* Hassk. in Peters, Reise Mossamb. Bot. 529.

Upper Guinea. Liberia: Grand Bassa, *Vogel*, 40! Cape Palmas, *Ansell!* Gold Coast, *Burton & Cameron!* Ashanti, *Cummins!* Togo, *Buettner*, 262! Lagos, *Millen*, 22! 91! *Moloney!* Western Lagos, *Rowland!* Old Calabar, *Holland*, 110! *Robb!* Cameroons: Barombi, *Preuss*, 1195! Batanga, *Bates*, 71! Fernando Po, *Vogel*, 7! *Barter! Mann*, 92!

Nile Land. British East Africa: Niamniam; at Linduku (Unduku) River, *Schweinfurth*, 3284! at Nabambisso River, *Schweinfurth*, 3698! Ruwenzori; Butugu Valley, *Scott-Elliot*, 7977!

Lower Guinea. Gaboon, *Du Bellay, Du Parquet.* French Congo: Franceville, *Brazza.* Bangui, *Dybowski*, 528; Cape Lopez, *Dybowski*, 172; Congo, *Smith*, 53! 57! Lower Congo: Bingila, *Dupuis!* Blakasi, *Burton!* Angola: Golungo Alto, 1000–2100 ft., Mata de Quibanga, Sobato Mussengue, *Welwitsch*, 6600! Zengas de Queta, *Welwitsch*, 6600B! in woods on the banks of streams near Trombeta, Cambondo, and Sange, *Welwitsch*, 6601! 6654!

Mozamb. Dist. British Central Africa: Nyasaland; Masuku Plateau, 6500–7000 ft., *Whyte*, 305! Mount Malosa, 4000–6000 ft., *Whyte!* and without precise locality, *Buchanan*, 1167!

The number of ovules is often 3 in each cell of the ovary, but not always. The variation in the size of the panicle is great.

8. **A. Rendlei,** *C. B. Clarke.* Sparsely hairy. Stems 15 in. long, undivided, rather slender. Leaves $3\frac{1}{4}$ by $\frac{1}{2}$ in., exactly lanceolate, acuminate at either end, the base almost pseudo-petiolate, with a few scattered brown hairs especially on the lower margins; leaf-sheaths unusually long (some 1 in. long) glabrescent. Peduncle terminal, 3–4 in. long, with a leaf-sheath (without leaf) in the middle. Inflorescence

dense, minutely or scarcely pubescent; primary axis well marked; primary branches having in their lower half many approximated small ovate empty bracts (as in *A. beniniense* and many other species). Capsule $\frac{1}{3}$ by $\frac{1}{8}$ in., linear-oblong, obtuse, 2-celled, papery, shining; seeds 3–5 in each cell.

Nile Land. Somaliland, *Donaldson Smith!*

This species resembles the Australian *A. acuminatum*, R. Br.; it has a much denser inflorescence and a longer capsule. On the same day, Donaldson Smith also collected his 346, which has a looser inflorescence and a smaller capsule (in which a 1-seeded third cell is sometimes present), and is very near *A. acuminatum*, R. Br., under which possibly both plants may be hereafter placed.

9. **A. ovato-oblongum,** *Beauv. Fl. Owar.* ii. 71, *t.* 104, *fig.* 1. Very sparingly hairy. Stem 1–2 ft. long, trailing, rooting near the base. Leaves $2\frac{1}{2}$ by 1 in., elliptic, acuminate. Panicle 2 by $1\frac{1}{2}$ in., with 8–18 primary branches often falsely whorled, slender, nearly glabrous; bracts at their base minute. Flowers very small, pale lilac or white. Sepals less than $\frac{1}{6}$ in. long, thin, ovate, concave. Fertile stamens (at least often) 3; filaments slightly hairy. Capsule $\frac{1}{10}$–$\frac{1}{5}$ in. long, shining, thin, quadrate, the upper shoulders rounded, normally 4-seeded. Seeds pale, stony.—Benth. in Hook. Niger Fl. 545; C. B. Clarke in DC. Monogr. Phan. iii. 226; Durand & Schinz, Conspect. Fl. Afr. v. 431, and Études Fl. Congo, i. 270; Durand & De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 87; Schoenl. in Engl. & Prantl, Pflanzenfam. ii. iv. 65; Hua in Bull. Mus. Hist. Nat. Par. i. 121. *A. bracteolatum*, R. Br. in Bowditch, Mission to Ashantee, 444. *Commelina umbrosa*, Vahl, Enum. ii. 179; Thonn. in Schumacher, Beskr. Guin. Pl. 23. *C. ovato-oblonga*, Roem. & Schultes, Mant. i. Add. i. 376.

Upper Guinea. Sierra Leone: near Berria, in dense forest, *Scott-Elliot*, 5424! Liberia: Cape Palmas, *Ansell!* Dahomey: Lake Porto Nova, *Newton*, 14! Gold Coast, *Burton & Cameron!* Fernando Po, *Vogel*, 143! *Milne!* Cameroons, *Preuss*, 396!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 336! and without precise locality, *Tedlie!* French Congo: Ogowe River, *Thollon*, 266 bis; Brazzaville, *Dybowski.* Loango; Chinchocho, *Soyaux*, 169! Landana, *Phillips.* Lower Congo: Bingila, *Dupuis!*

Also in Tropical South America.

Var. *β nigritana*, C. B. Clarke in DC. Monogr. Phan. iii. 227. Leaves 6 by 2 in. Panicle hardly peduncled, much overtopped by the leaves; its main axis and the sepals minutely pubescent. Empty bracts at the base of the cymes numerous, close together.

Upper Guinea. Niger Territory: Nupe; Jeba, on the Quorra (Niger), *Barter!*

10. **A. somaliense,** *C. B. Clarke.* Sparingly pubescent. Upper leaves $2\frac{1}{2}$ by $1\frac{1}{4}$ in., ovate, acute; base sessile on the leaf-sheath, rounded. Peduncle to the panicle 3 in. long, terminal; panicle $1\frac{3}{4}$ by $1\frac{1}{4}$ in., main axis straight; cyme-peduncles about 24, spreading, scattered, not whorled, bracts at their base less than $\frac{1}{8}$ in. long, ovate. Sepals $\frac{1}{8}$–$\frac{1}{6}$ in. long, concave, nearly glabrous. Petals small, white.

Capsule 2-celled, ellipsoid, shining, with rounded shoulders, obscurely emarginate, 4-seeded.

Nile Land. Somaliland: Harradigit, *James & Thrupp!*

The specimen consists of a panicle with the 3 uppermost leaves.

11. **A. Smithii,** *C. B. Clarke.* Sparingly pubescent. Roots clustered, thick, several thickened at the end. Stems cæspitose, erect, 5 in. high, often divided, the flowering with several well-developed leaves. Leaves small, broadly ovate, subacute, the largest seen $1\frac{1}{8}$ by $\frac{3}{4}$ in. Inflorescence terminal, $1\frac{1}{2}$ by $\frac{3}{4}$ in., dense; peduncle 1–$1\frac{1}{2}$ in. long; main rhachis well marked; bracts at the base of the primary branches $\frac{1}{16}$ in. long, ovate or obovate, obtuse, somewhat scarious; similar small empty bracts on the lower half of the primary branches. Flowers very small; pedicels and sepals obscurely pubescent.

Nile Land. British East Africa: Lake Rudolph, *Donaldson Smith!*

12. **A. dregeanum,** *Kunth, Enum.* iv. 73. Sparingly hairy. Stems 12–18 in. long, suberect, frequently branched. Leaves 4 by $\frac{3}{4}$–$1\frac{1}{2}$ in., oblong-elliptic or subovate, lower with a quasi-petiole, $\frac{1}{4}$–$\frac{3}{4}$ in. long, all (but occasionally the topmost) shortly acuminate at the base. Panicle $1\frac{1}{4}$ by $\frac{3}{4}$–1 in., dense, nearly glabrate. Sepals $\frac{1}{8}$–$\frac{1}{6}$ in. long. Petals small, blue. Fertile stamens usually 3. Capsule $\frac{1}{4}$ by $\frac{1}{6}$ in., thin, shining, usually 2-celled, shoulders rounded. Seeds 2–1 in each cell, pale, stony.—C. B. Clarke in DC. Monogr. Phan. iii. 229, and in Dyer, Fl. Cap. vii. 13. *Lamprodithyros dregeanus*, Hassk. in Peters, Reise Mossamb. Bot. 529.

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; Tete, *Kirk!*

Also in the North-Eastern parts of South Africa.

13. **A. Nicholsoni,** *C. B. Clarke.* Leaves $3\frac{1}{2}$ by 1 in., broadly elliptic acuminate at either end, when mature thinly hispid on both surfaces, those near the top of the stem with a pseudo-petiole $\frac{1}{2}$ in. long. Peduncle 1–2 in. long, terminal, patently hispid. Panicle $1\frac{1}{2}$ by $\frac{3}{4}$–1 in., very dense; cyme-peduncles very numerous and (as the pedicels) hispid; bracts minute. Calyx small, nearly glabrous. Petals very small, bright blue in the dry specimens. Capsule $\frac{1}{6}$ in. long, 2-celled, 4-seeded.

Mozamb. Dist. British Central Africa: Rhodesia; on the road from Missala to Luia River, *Nicholson!*

14. **A. Petersii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 225. Thinly hairy. Stems 12–18 in. long, sometimes branched in the upper part. Leaves up to $3\frac{1}{4}$ by $\frac{2}{3}$–$\frac{3}{4}$ in., lanceolate. Panicle 2 by $1\frac{1}{2}$ in., rather loose; primary branches not whorled; in several cases a second penultimate panicle makes the inflorescence appear as dichotomous. Sepals $\frac{1}{8}$–$\frac{1}{6}$ in. long, nearly glabrous. Petals blue. Capsule $\frac{1}{5}$–$\frac{1}{6}$ in., normally 2-celled with 2 seeds in each cell, minutely glandular pubescent, less papery than in most of the section *Lamprodithyros*.—Durand & Schinz, Conspect. Fl. Afr. v. 431; K. Schum. in Engl. Pfl. Ost-Afr. C.

136. *A. tetraspermum*, K. Schum. in Engl. Pfl. Ost-Afr. C. 136. *Lamprodithyros Petersii*, Hassk. in Peters, Reise Mossamb. Bot. 529.

Mozamb. Dist. German East Africa: Usambara; Tanga, *Volkens*, 175! *Stuhlmann*, 6062, 6458. Portuguese East Africa: Zambesi Delta; mouth of the River Melambe, *Kirk!* Mozambique, in damp places, *Peters!*

15. **A. Schweinfurthii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 227. Minutely pubescent. Roots thick. Stems 8–14 in., with few oblong leaves, 1–2 in. long; erect from a short rhizome (not annual). Leaves on a barren stem $4\frac{1}{2}$ by $\frac{1}{2}$ in., oblong-linear. Panicle in fruit $1\frac{1}{4}$ by $\frac{3}{4}$ in., very dense, pubescent; lowest bracts to the cyme-peduncles $\frac{1}{8}$ in. long, lanceolate; bracteoles $\frac{1}{12}$ in. long, obovate. Sepals $\frac{1}{10}$ in. long, glabrate. Petals small, blue. Capsule nearly $\frac{1}{4}$ in. long, white, 2-celled, 4-seeded.—Durand & Schinz, Conspect. Fl. Afr. v. 432; Durand & De Wild. in Bull. Soc. bot. Belg. xxxvii. 128; K. Schum. in Engl. Pfl. Ost-Afr. C. 136; DC. Monogr. Phan. iii. 227. *Lamprodithyros gracilis*, Kotschy & Peyr. Pl. Tinn. 47, t. 23, fig. A; Kanitz in Flora, 1868, 513; Hassk. in Schweinf. Beitr. Fl. Aethiop. 295.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 1332! ser. iii. 214! Bongo; Gir, *Schweinfurth*, 1886!

South Central. Congo Free State: Tanganyika, *De Beerst!*

16. **A. Welwitschii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 229. Minutely grey pubescent. Stems cæspitose on a bundle of thick roots clavate and subtuberous at their extremities. Fertile stems 10–16 in. long, rather robust, little divided, with many fully developed leaves. Leaves 3 by $\frac{2}{3}$–1 in., oblong or elliptic-lanceolate, sessile, tip obtuse. Peduncle 2–4 in. long, terminal, with often a sheath or nearly obsolete leaf in the middle. Panicle in fruit 1 by $\frac{3}{4}$ in., even in fruit very dense; flowers blue (*Welwitsch*). Capsule $\frac{1}{3}$ by $\frac{1}{6}$ in., quadrate-oblong, shining, thinly crustaceous, 4-seeded.—Durand & Schinz, Conspect. Fl. Afr. v. 432; Rendle in Cat. Afr. Pl. Welw. ii. 79.

Lower Guinea. Angola: Huilla; edges of woods, Lake Ivantala, 3800–5500 ft., *Welwitsch*, 6596! Golungo Alto; marshy places between Catumba and Ohai, *Welwitsch*, 6597!

The leaves in 6596 are considerably broader than in 6597; but no one has doubted their being one species. I think this may be only a state of *A. Schweinfurthii.*

17. **A. soudanicum,** *C. B. Clarke.* Hispid, especially the stems and leaf-sheaths. Stems 15 in. long, branched throughout their length, at the base erect, with the lowest leaves reduced to pale brown scales; roots thick. Leaves up to $3\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., linear-lanceolate. Panicle terminal, peduncled, $1\frac{1}{2}$ by $\frac{3}{4}$–1 in., dense, thinly hairy; lowest bracts $\frac{1}{6}$–$\frac{1}{5}$ in. long, lanceolate; bracteoles hardly $\frac{1}{8}$ in. long, ovate. Sepals $\frac{1}{8}$ in. long, glabrate. Petals small, blue. Capsule $\frac{1}{5}$ in. long, 2-celled, 4-seeded, rounded on the shoulders.—*A. lanceolatum*, var. *β erolutior* partly,

C. B. Clarke in DC. Monogr. Phan. iii. 227; Durand & Schinz, Conspect. Fl. Afr. v. 431 partly.

Upper Guinea. Cameroons: Musgu; on the Fellata Hills, *Vogel*, 101!

18. **A. Whytei,** *C. B. Clarke.* Upper portions of stems 10 in. long, rather slender, pubescent, not rarely branched. Leaves $2\frac{1}{4}$ by $\frac{1}{2}$ in., lanceolate, when mature hairy, especially beneath. Panicle 1 by $\frac{3}{4}$ in., dense, with long spreading white hairs; lower bracts minute or 0; many of the lower pedicels sterile, terminated by a black glandular knob (the rudimentary flower). Sepals $\frac{1}{10}$ in. long, glabrate. Petals small, blue. Capsule hardly $\frac{1}{5}$ in. long, 2-celled, 4-seeded.—*A. hirtum*, C. B. Clarke in DC. Monogr. Phan. iii. 228 partly (i.e. by confusion), not of A. Rich. (which see at p. 74 seq.).

Mozamb. Dist. British Central Africa: North Nyasaland, *Whyte!*

The description of *A. hirtum* in DC. Monogr. Phan. iii. 228 is grounded on the assumption that the plant here described was the *A. hirtum* of A. Richard (which I now believe to have been a *Floscopa*).

19. **A. lanceolatum,** *Benth. in Hook. Niger Fl.* 546. Sparingly pubescent. Stems up to 15 in. long, occasionally divided, weak, decumbent at the base. Leaves up to 6 by $\frac{1}{2}$ in., narrowly lanceolate. Panicle terminal, peduncled, up to $1\frac{1}{4}$ by 1 in. (but usually much smaller), dense, minutely pubescent; lowest bracts $\frac{1}{10}$ in. long, ovate; bracts to the cyme-peduncles $\frac{1}{12}$ in. long, obovate. Sepals $\frac{1}{10}$ in. long, glabrate. Petals small, blue. Capsule $\frac{1}{5}$ in. long, 2-celled, 4-seeded, shoulders rounded at the top.—C. B. Clarke in DC. Monogr. Phan. iii. 227; Durand & Schinz, Conspect. Fl. Afr. v. 431. *A. rhodospermum*, K. Schum. in Zenker, Exsicc. 1110.

Upper Guinea. Niger Territory: Lower Niger; Stirling Hill, *Vogel! Ansell!* Quorra, *Vogel!* Cameroons: Bipinde, *Zenker*, 1110!

Var. β *evolutior*, C. B. Clarke in DC. Monogr. Phan. iii. 227 partly. Stems stout. Leaves up to 10 by $\frac{1}{2}$ in., linear or scarcely linear-lanceolate, very hairy or with sparse long hairs. Panicle 4 in. long, 2 in. wide at the base, 1 in. wide at the top; branches very numerous, lower in false whorls. Lower part of cymes represented often by numerous approximate empty bracts $\frac{1}{10}$ in. long. Flowers and capsules as of *lanceolatum*, but slightly larger.

Upper Guinea. Western Lagos: Eruwa, *Rowland!* Niger Territory: Nupe, *Barter*, 1018! 1117!

The base of the stem and roots are not shown: it seems probable that the stem may be erect, with thickened roots; and, if so, near *Welwitschii*. It, however, recalls *A. lanceolatum*, Benth., by the very long narrow leaves.

20. **A. Spekei,** *C. B. Clarke.* Rather thinly hairy. Stems 15–24 in. long, often branching; base decumbent, rooting at the nodes. Leaves 1 by $\frac{3}{4}$–1 in., rather broadly lanceolate, hardly acute. Panicle 2 by $\frac{3}{4}$ in., terminal, peduncled, dense, sparingly pubescent; lowest bracts minute, cyme-branches short. Sepals $\frac{1}{10}$ in. long, glabrate. Petals small, blue. Capsule $\frac{1}{5}$ in. long, 2-celled, 4-seeded, rounded on the shoulders.—*A. tacazzeanum*, Baker in Trans. Linn Soc. xxix. 163, not of Hochst. *A. lanceolatum*, C. B. Clarke in DC. Monogr. Phan. iii. 227 partly;

Durand & Schinz, Conspect. Fl. Afr. v. 431 partly; K. Schum. in Engl. Pfl. Ost-Afr. C. 136. *Aneilema*, sp. n. 1., T. Thoms. in Speke, Nile, Append. 650. *Lamprodithyros lanceolatus*, Hassk. in Schweinf. Beitr. Fl. Aethiop. 211, 295.

Mozamb. Dist. German East Africa: Unyamwezi; near Tabora, 3800 ft., *Speke & Grant!* Mininga, *Speke & Grant*, 165! British Central Africa: North Nyasaland, *Whyte!*

This has not the elongate leaves of *A. lanceolatum*, and the panicle is different; but it is closely allied to it.

21. **A. gracile,** *C. B. Clarke in DC. Monogr. Phan.* iii. 228, *excl. syn.* Sparingly hairy or glabrate. Stems 10–12 in. long, slender, often divided. Leaves attaining $2\frac{1}{4}$ by $\frac{1}{6}$ in. Panicle terminal, peduncled, $2\frac{1}{2}$ in. long, $\frac{2}{3}$ in. wide at the base, $\frac{1}{3}$ in. wide at the top; lowest bracts $\frac{1}{5}$ in. long, lanceolate; cymes short, with few empty bracts. Sepals $\frac{1}{10}$ in. long, glabrate. Petals small, bluish-purple (*Barter*). Capsule $\frac{1}{5}$ in. long, 2-celled, 4-seeded, shoulders rounded at the top.—Durand & Schinz, Conspect. Fl. Afr. v. 430, excl. syn.

Upper Guinea. Niger Territory: Nupe, in cultivated soils, *Barter*, 1474!

This may be only a variety of *A. lanceolatum*, var. *evolutior*; it is much more glabrous, slenderer, with smaller leaves and smaller panicle. But in the shape of the panicle, the flowers and the capsules, it agrees perfectly; and comes from the same locality.

22. **A. pedunculosum,** *C. B. Clarke in DC. Monogr. Phan.* iii. 228, *excl. var.* γ. Weak, trailing and rooting, sparsely hairy. Stems 6–24 in. long, often branched. Leaves 2 by $\frac{3}{4}$ in., elliptic or ovate, acuminate, when mature nearly glabrous. Inflorescences dense, small, $\frac{3}{4}$–$1\frac{1}{2}$ by $\frac{1}{2}$–$\frac{2}{3}$ in.; peduncle terminal, sometimes few-flowered, frequently on short lateral branches, 1–4 in. long; axis of inflorescence with small crisped hairs. Sepals hardly $\frac{1}{10}$ in. long, minutely pubescent or glabrate. Petals very small, blue. Fertile stamens usually 3; filaments slightly hairy. Capsule $\frac{1}{5}$ by $\frac{1}{6}$ in., thin, shining, pale, the shoulders rounded at the top; usually 2-celled, with 2 pale stony seeds on each cell.—Oliver in Trans. Linn. Soc. ser. 2, Bot. ii. 352; Durand & Schinz, Consp. Fl. Afr. v. 431; K. Schum. in Engl. Pfl. Ost-Afr. C. 136. *A. leiocaule*, K. Schum. in Engl. Pfl. Ost-Afr. C. 136.

Nile Land. British East Africa: Uganda, *Scott-Elliot*, 7266! *Wilson*, 139! Toru; Wimi River, 6000 ft., *Scott-Elliot*, 7335!

Mozamb. Dist. German East Africa: Kilimanjaro, 6500–9000 ft., *Johnston*, 175! *Volkens*, 1436! Rovuma River, *Kirk!* Portuguese East Africa: Lower Zambesi; Shiramba, *Kirk*, 265! British Central Africa: Zambesi Valley; Boruma, *Menyharth*, 610! Nyasaland; Nyika Plateau, 6000–7000 ft., *Whyte*, 212!

23. **A. Clarkei,** *Rendle in Journ. Linn. Soc.* xxx. 430, *t.* 34, *figg.* 7–12. Sparingly hairy. Stems (portions seen) up to 14 in. long, trailing, rooting, with long nodes and many branches. Leaves somewhat polymorphic, upper (as some lower) 1 by $\frac{1}{2}$ in., ovate-elliptic, tip triangular obtuse or almost rounded; on the same stem are other leaves $1\frac{1}{2}$ by

$\frac{1}{3}$ in., lanceolate, acute. Inflorescences of about 8 flowers "in axillary cymes" (*Rendle*), or rather terminal on short axillary branches; bracts to the lower cyme-branches $\frac{1}{4}$–$\frac{3}{4}$ in. long and leaf-like; no small ovate empty bracts on the primary panicle branches. Stamens 3 or 2 fertile, 3 sterile. Capsule $\frac{1}{12}$ in. long, the two anterior cells 2- (or 1-) seeded, the dorsal cell 1-seeded. Seeds stony, much as those of species of the section *Lamprodithyros*.

Nile Land. British East Africa: Lower Tana Valley at Lake Dumi, *Gregory!*

24. **A. Taylori,** *C. B. Clarke*. Sparingly pubescent. Fragment of stem seen 8 in. long, with 4 inflorescences on short axillary branches. Leaves attaining $\frac{2}{3}$ by $\frac{1}{4}$ in., broadly lanceolate, acute. Inflorescence very weak, lax, subdichotomous, without bracts at the main divisions; branches slender $\frac{1}{3}$–$\frac{2}{3}$ in. long, with several small empty ovate bracts below, and few capsules on pedicels $\frac{1}{4}$ in. long. Capsule less than $\frac{1}{6}$ in. long, 2-celled, 4-seeded, very thin, white, papery.

Nile Land. British East Africa: Fimbine, in the Rabai Hills, near Mombasa, *Taylor!*

Imperfectly known species.

25. **A. Sacleuxii,** *Hua in Bull. Mus. Hist. Nat. Par.* i. 121. Panicle loose, elongate; peduncles pubescent; bracts lanceolate; cymes peduncled, 4–6-flowered, sometimes 2–3 close together, with acute bracteoles ciliate at the base. Capsule stalked, 2-angled at the top, 2-valved. Seeds 2 in each cell, a third 1-seeded (or empty) cell added.

Mozamb. Dist. Zanzibar?, *Sacleux*.

Next to *A. tacazzeanum*. The bracts and bracteoles as described appear very unlike those of any plant in sect. *Amelina*. The description (except as to the capsule being 2-angled at the top) might do for *A. soudanicum*.

26. **A. hirtum,** *A. Rich. Tent. Fl. Abyss.* ii. 343. Root fibrous. Stem a span high, much branched from the base, hairy. Leaves oval-oblong, acute. Panicle terminal, dichotomous from the base, many-flowered; primary peduncles paired, 2 in. long. Capsule obcordate, compressed; cells 2, with one long ovoid seed in each cell.—*Lamprodithyros hirtus*, Hassk. in Schweinf. Beitr. Fl. Aethiop. 295.

Nile Land. Abyssinia: Shireh province, in moist places near Kouaieta, *Quartin-Dillon* (ex *A. Richard*).

The whole of the above is condensed from A. Richard's description. I have little doubt, from the description of the inflorescence, that this was a species of *Floscopa*; it certainly was if A. Richard is correct as to the obcordate capsules with one seed in each cell. In DC. Monogr. Phan. iii. 228, I have confused it with an *Aneilema*, described above (p. 72) under the name *A. Whytei*.

27. **A. Ehrenbergii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 229. A procumbent rooting herb. Leaves round-ovate or ovate, acute, ciliate at the base. Inflorescence terminal, or terminal on lateral branches, loosely panicled, minutely bracteate at each division, with spreading branches. Flowers small. Fruits shining, 2-celled, with 2

superposed seeds (or 1) in each cell.—Durand & Schinz, Conspect. Fl. Afr. v. 430. *Lamprodithyros Ehrenbergii*, Hassk. in Schweinf. Beitr. Fl. Aethiop. 210, 295. *Commelina ebracteata*, Ehrenberg ex Hassk. l. c.

Nile Land. Eritrea : near Togodele, in Sholos district, *Ehrenberg*.

This is reduced by Schweinfurth (in Bull. Herb. Boiss. ii. Append. ii. 58) to *A. Forskalei*, Kunth; which appears to me impossible, as see the remarks under *A. tacazzeanum* above (p. 66). *A. Ehrenbergii* may have been the same as Schimper's 1660, 1729, i.e. *A. tacazzeanum* above.

28. **A. Russegeri,** *C. B. Clarke. Lamprodithyros Russegeri*, Fenzl in Sitzungsb. Akad. Wien, Math. Nat. i. Abth. ii. (1865) 138; Schweinf. Beitr. Fl. Aethiop. 295; cfr. Kotschy & Peyr. Pl. Tinn. 48 in obs.

Nile Land. Nubia and Fazokl, *Fenzl*.

I have no specimen of this, nor have I been able to see the original description of Fenzl. According to Kotschy & Peyritsch, it is very near *A. Schweinfurthii*.

6. **ANTHERICOPSIS,** Engl. in Engl. Pfl. Ost-Afr. C. 139.

Sepals $\frac{1}{2}$ in. long, lanceolate, very acute, herbaceous, striate. Otherwise as *Aneilema*

Species 1. Endemic.

Engler says that the seeds are in two rows in the capsule, which is true in the sense that they are biseriate in the culinary pea-pod. In separating this plant from *Aneilema*, Rendle mentions various distinctive points—viz. 1st, that the 3 fertile stamens belong to the external whorl; but I believe that they do not, but are as in other Aneilemas; 2nd, that the inflorescence is umbellate; but I do not consider it is even pseudo-umbellate; I regard it as essentially that of *Aneilema* (Indian Section, *Murdannia*); 3rd, that the pollen is echinate. I have seen the pollen well and think it not echinate, and hardly more strongly granular than in some species of *Aneilema*; but it is without the longitudinal groove present in *Aneilema* pollen. The sepals are, however, very unlike those of any *Aneilema*, and show an approximation to the genus *Buforrestia*.

1. **A. Fischeri,** *Engl. in Engl. Pfl. Ost-Afr. C.* 139. Nearly glabrous, 2–8 in. high. Roots wiry, 2–3 in. long, each terminated by a hard ovoid tuber $\frac{1}{4}$–$\frac{1}{3}$ in. long. Stem only 1–2 in. long (exclusive of the flower scape). Leaves up to 3 by $\frac{3}{4}$ in., ovate or elliptic acute. Inflorescence a panicle of 2 (or 1) distant clusters of falsely-whorled pedicels; bracts sessile, lanceolate, attaining $1\frac{1}{2}$ by $\frac{1}{5}$ in., flat, not at all hooded. Pedicels unequal, often $\frac{1}{2}$–$1\frac{1}{2}$ in. long in each cluster. Petals $\frac{1}{2}$ in. long. Stamens 3, fertile; filaments without hairs; anthers nearly similar, of 2 oblong cells; pollen small, ellipsoid-subglobose, granular, not grooved longitudinally. Capsule (unripe) $\frac{3}{4}$ by $\frac{1}{10}$ in., with 5 or more seeds in each cell in one row.—*A. sepalosa*, Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. zu ii.–iv. 69. *Aneilema sepalosum*, C. B. Clarke in DC. Monogr. Phan. iii. 202; Durand & Schinz. Consp. Fl. Afr. v. 432; K. Schum. in Engl. Pfl. Ost-Afr. C. 135. *Gillettia sepalosa*, Rendle in Journ. Bot. 1896, 56, t. 355, fig. B.

Nile Land. Somaliland : El Modu, *Donaldson Smith*. British East Africa Ukambi; Kitui, *Hildebrandt*, 2640!

Mozamb. Dist. German East Africa: Umba Valley, *Smith!* Masai Highlands, *Fischer*, 258. Portuguese East Africa: in a journey to the mountains east of Lake Nyasa, *Steere!*

7. BUFORRESTIA, C. B. Clarke; Benth. et Hook. f. Gen. Pl. iii. 850.

Sepals 3, elliptic-lanceolate or oblong. Petals 3, obovate. Stamens 6, perfect; filaments without hairs. Ovary subequally 3-celled. Capsule oblong, 3-valved. Seeds 4–10 in each cell, in one vertical row.—Leaves with long cylindric sheaths, which are not rarely pierced at the base by a roundish hole through which a lateral shoot or a peduncle is extended. Panicle open.

Species, 2 in Tropical Africa, 1 in Cayenne.

Sepals in fruit $\frac{1}{2}$ in. long, glabrous, striate . . 1. *B. Mannii.*
Sepals in fruit $\frac{1}{5}$ in. long, viscid-hairy . . . 2. *B. imperforata.*

1. **B. Mannii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 233, *t.* 6. Nearly glabrous. Stem 2 ft. long. Leaves up to $6\frac{1}{2}$ by $2\frac{3}{4}$ in., tip shortly acuminate, base cuneate. Peduncles none near the end of stem, but boring through the base of the leaf-sheaths, 1–3 in. long. Panicle 2 by $\frac{3}{4}$ in., about 12-flowered; pedicels 3 or 4 in each false whorl, $\frac{1}{2}$ in. long, with an oblong bract about $\frac{1}{4}$ in. long at their base. Sepals $\frac{1}{2}$ in. long in fruit, elliptic-lanceolate, striated, glabrous, "green" (*Mann*); in flower hardly $\frac{1}{4}$ in. long. Petals white (*Mann*). Capsule $\frac{1}{4}$-$\frac{1}{3}$ in. long, oblong, glabrous, with 4–7 seeds in each cell.—Durand & Schinz, Conspect. Fl. Afr. v. 432.

Upper Guinea. Fernando Po, *Mann*, 96.

The material consists of $1\frac{3}{4}$ in. of the middle of the stem, with 2 leaves and 2 peduncles; and of $1\frac{1}{4}$ in. of the tip of the stem with 3 leaves.

2. **B. imperforata,** *C. B. Clarke in DC. Monogr. Phan.* iii. 234, *t.* 7. Plant thinly viscous with scattered brown several-celled hairs. Stem often rooting near the base; branches 10–20 in. long. Leaves 4 by $1\frac{2}{3}$ in., acuminate, acute; lower leaves much smaller, sometimes reduced to sheaths. Peduncles several from the axils of the uppermost closely approximated leaves, very short, irregularly branched, bearing ultimate racemes; in these racemes, the small broad bracts $\frac{1}{8}$ in. long are mostly sterile, the upper bracts only bearing a pedicel $\frac{1}{6}$–$\frac{1}{4}$ in. long (exactly as in many species of *Aneilema*). Sepals in fruit about $\frac{1}{5}$ in. long, viscid hairy, dark green. Petals small, white, or "white with purple streaks" (*Welwitsch*). Capsule $\frac{1}{3}$ by $\frac{1}{8}$ in., with 6–10 seeds in each cell.—Durand & Schinz, Conspect. Fl. Afr. v. 433; Durand & De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 87; Rendle in Cat. Afr. Pl. Welw. ii. 80. *B. minor*, K. Schum. in Engl. Pfl. Ost-Afr. C. 136.

Upper Guinea. Sierra Leone; Kukuna, near the River Scarcies, *Scott-Elliot*, 4678 partly! Cameroons: Cameroon Mountain, 2500 ft., *Mann*, 1340! *Preuss*, 1297! near the Lobe River waterfall, near Batanga, *Bates*, 145! Barombi, *Preuss*, 287! Efulen, *Bates*, 258! Lolodorf, *Staudt*, 385! Bipinde, *Zenker*, 1094! Fernando Po, 2000 ft., *Mann!*

Lower Guinea. Princes Island, *Mann!* Lower Congo: Bingila, *Dupuis!* Angola: Cazengo; by streams in the Coffee region of Mount Muxaulo, *Welwitsch*, 6607!

B. minor, K. Schum., differs by having the leaves with very few hairs or glabrate except at the mouth of the sheaths. The lower axillary shoots sometimes perforate the leaf-sheath, as in the type.

Mozamb. Dist. German East Africa: Usambara; Nguelo, near Nderema (? Ngerema), on the Handei Mountains, *Holst*, 2280A.

8. **FORRESTIA**, A. Rich.; Benth. et Hook. f. Gen. Pl. iii. 850.

Sepals 3, small, concave, hooded. Stamens 6 fertile; filaments with beaded hairs. Ovary 3-celled, with 2–1 ovules in each cell. Capsule subglobose; otherwise as *Buforrestia*.—Flowers in small clusters on very short axillary peduncles, which generally perforate the base of the leaf-sheaths.

Species 8, viz. 6 in South-east Asia, and the 2 following:

Spikes subglobose; stems quadrangular . . . 1. *F. tenuis.*
Spikes linear-oblong; stems terete . . . . 2. *F. africana.*

1. **F. tenuis,** *Benth. in Benth. et Hook. f. Gen. Pl.* iii. 851. Nearly glabrous, except at the ciliate mouths of the leaf-sheaths. Stems 1–2 ft. high (*Mann*); portions seen 9 in. long, subacutely quadrangular, with 3 subterminal leaves and 4 leafless lower nodes $2\frac{1}{2}$ in. apart. Leaves $3\frac{1}{2}$ by $1\frac{1}{2}$ in., broadly elliptic, tip very shortly acuminate, base rounded on the quasi-petiole, $\frac{1}{4}$–$\frac{1}{3}$ in. long. At each of the lower nodes is a leafless cylindric sheath $\frac{1}{2}$ in. long, bored at the base by a peduncle $\frac{1}{8}$ in. long, carrying a dense head hardly $\frac{1}{3}$ in. in diam. Sepals $\frac{1}{10}$ in. long, glabrous. Filaments with a few hairs. Ovary glabrous, with 2–1 ovules in each cell.—Durand & Schinz, Conspect. Fl. Afr. v. 433. *Buforrestia ? tenuis*, C. B. Clarke in DC. Monogr. Phan. iii. 234.

Lower Guinea. Spanish Gaboon: Corisco Bay, *Mann*, 1873!

The essential difference of *Forrestia* from *Buforrestia* lies in the 2–1-ovuled cells of the ovary leading to a globose (not narrow-oblong) capsule. As I was not absolutely certain about the number of ovules, and as *Forrestia* is a genus confined to South-east Asia, I attached this species with (?) to *Buforrestia* in DC. Monogr. Phan. l.c. Mr. Bentham has satisfied himself that the ovules are 2–1 only in each cell, and he observes that the inflorescence is exactly that of *Forrestia*, and (as between these two genera) considers that this species ought to be attached to *Forrestia*. But I suspect, when the fruit is known, that it will be found to be a new genus; the quadrangular branches and rounded leaf-base are exceedingly unlike *Forrestia*.

2. **F. africana,** *K. Schum.* Nearly glabrous, except the ciliate mouth of the leaf-sheaths. Stem 2 ft. (at least) long, trailing, rooting at the nodes, terete or very obscurely angular, leafless below. Leaves 4 by $\frac{1}{2}$ in., elliptic, narrowed at the base into a quasi-petiole $\frac{1}{4}$–$\frac{1}{2}$ in. long. Peduncles less than $\frac{1}{8}$ in. long, perforating the base of the leaf-sheaths. Inflorescences $\frac{3}{4}$–$1\frac{1}{4}$ by $\frac{1}{5}$ in., very dense unilateral spikes, obscurely pubescent; the ovate green bracts $\frac{1}{8}$ in. long, imbricated in two series (as in many species of *Cyanotis*).

Upper Guinea. Cameroons, *Preuss*, 1319! Bipinde, *Zenker*, 853!

9. **CYANOTIS,** D. Don; Benth et Hook. f. Gen. Pl. iii. 851.

Sepals 3, lanceolate, more or less connate at the base. Petals 3, small, blue or reddish, long-clawed, free at the base, the claws more or less adherent into a tube. Stamens 6, perfect, similar; filaments with many or few beaded hairs, rarely quite glabrous. Ovary sessile, hairy at the top, 3-celled; ovules 2 in each cell. Capsule thin, 3-celled, loculicidally 3-valved, normally 6–5-seeded. Seeds 2 in each cell, superposed; the large embryostega at the apex of the upper seed, at the base of the lower.—Flowers, in all the Tropical African species, packed closely in very short scorpioid cymes; the falcate bracts frequently imbricate in 2 rows, or the rows are not well marked, the flowers appearing irregularly and densely clustered; the clusters are sometimes in the leaf-sheaths, sometimes collected in heads—i.e. compound clusters.

Species 30 or more in the warm regions of the Old World.

The Tropical African species all belong to the subgenus *Eu-Cyanotis*, and are very closely allied; the flowers and capsules are so very similar in all the species that the description in the genus may do well for all.

*Stem suberect from a bulb.
  Inflorescences in small heads, exserted from the leaf-sheaths.
    Leaves lanceolate or oblong-lanceolate.
      Bulb about $\frac{1}{2}$ in. in diam. . . . . 1. *C. hirsuta.*
      Bulb scarcely $\frac{1}{4}$ in. in diam. . . . . 2. *C. parasitica.*
    Leaves linear . . . . . 3. *C. angusta.*
  Inflorescences axillary, hardly exserted from the leaf-sheaths . . . . . 4. *C. fœcunda.*

**Stem annual, suberect, slender, often much divided.
  Inflorescences dense, often clustered . . . 5. *C. lanata.*
  Inflorescences very weak, few-flowered . . . 6. *C. pauciflora.*

***Plants neither bulbous nor annual. Flowering stems often lateral; sterile stems very short, bearing a tuft of larger leaves.
  Inflorescences not included (nor nearly included) in the leaf-sheaths.
    Stems abrupt at the base; roots thick.
      Flowering stems hemiscapose with 1 or 2 heads 7. *C. longifolia.*
      Flowering stems with well-developed leaves.
        Small plant with many axillary heads . . 8. *C. polyrrhiza.*
        Tall plant with few axillary heads . . 9. *C. djurensis.*
    Stem abrupt at the base; roots not thickened.
      Stems erect, hemiscapose; roots wiry . . . 10. *C. cæspitosa.*
      Stems with well-developed leaves at the base . 11. *C. nodiflora.*
    Stem creeping in water, with slender rootlets . 12. *C. Mannii.*
  Inflorescences included, or nearly so, in the leaf-sheaths.
    Flowering stem 4–9 in. long, undivided . . 13. *C. somaliensis.*
    Flowering stem 20 in. long, much-branched . 14. *C. flexuosa.*

1. **C. hirsuta,** *Fisch. et Mey. Ind. Sem. Hort. Petrop.* viii. 57. Softly shaggy, or nearly glabrous. Bulb $\frac{1}{2}$ in. in diam., eatable (*Roth*). Stem 3–15 in. long, suberect, often divided, with many heads, roundish,

sometimes with spreading hair on all sides, often with a dense line of shaggy hair on one side, sometimes nearly glabrate. Leaves in Schimper's type collections, attaining 4 by $\frac{1}{2}$ in., oblong-lanceolate. Inflorescences 6–15 on one stem, $\frac{1}{2}$–$\frac{3}{4}$ in. in diam., of one or several clustered cymes; outer bracts sometimes 1–2 in. long with elongate falcate recurved tips, sometimes ovate abbreviated $\frac{1}{3}$ in. long; cymes many-flowered; bracteoles $\frac{1}{4}$–$\frac{1}{3}$ in. long, falcate-lanceolate, very regularly imbricated in two rows, or in other heads on the same stem, obscurely (or not) 2-ranked. Capsule $\frac{1}{8}$ in. long.—C. B. Clarke in DC. Monogr. Phan. iii. 254; Engl. Hochgebirgsfl. Trop. Afr. 155; Durand & Schinz, Conspect. Fl. Afr. v. 433; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 59; K. Schum. in Engl. Pfl. Ost-Afr. C. 136 (incl. var. β *glabra*); Rendle in Journ. Linn. Soc. xxx. 431. *C. abyssinica*, A. Rich. Tent. Fl. Abyss. ii. 344, t. 98; Hassk. Commel. Ind. 139, and in Schweinf. Beitr. Fl. Aethiop. 295. *C. barbata*, Schweinf. Beitr. Fl. Aethiop. 295 partly, not of D. Don. *Zygomenes abyssinica*, Hassk. in Schweinf. Beitr. Fl. Aethiop. 211. *Commelina hirsuta* Hochst. ex C. B. Clarke in DC. Monogr. Phan. iii. 254, not of R. Br. nor of Kunth.

Nile Land. Eritrea: Mount Kube, 5900 ft., *Schweinfurth & Riva*, 1511! Mogod Valley, 4200 ft., *Schweinfurth & Riva*, 1554! Ginda, 2600 ft., *Schweinfurth*, 395; Bizen, 5800 ft., *Schweinfurth*, 1885; Habab, 7800 ft., *Hildebrandt*, 371! Abyssinia: near Adowa, *Schimper*, 14! *Quartin-Dillon!* Mount Sholoda, *Schimper*, 59, Agrima, *Schimper*, 584! near Jelajeranne (Tchelatchekenneh), *Schimper*, 1556! Begemeder; Debra Tabor, *Schimper*, 1107! Shireh province, *Quartin-Dillon!* Wojerat province, *Quartin-Dillon!* Shoa, *Petit!* Ankober, *Roth*, 176! and without precise locality, *Plowden!* British East Africa: Leikipia, 6000–8000 ft., *Thomson!* near Mombasa, *Taylor*.

Mozamb. Dist. German East Africa: Kilimanjaro, 8700 ft., *Volkens*, 1915! British Central Africa: Nyasaland; Mount Zomba Plateau, 5000–6000 ft., *Whyte!* Zomba and vicinity, 2500–3500 ft., *Whyte!*

The last-cited two collections of Whyte do not show the root; many of the species of *Cyanotis* are so much alike that I do not feel at all confident (in the absence of a bulb) that Whyte's specimens belong to *C. hirsuta*.

2. **C. parasitica,** *Hochst. ex Hassk. Commel. Ind.* 116. Sparingly hairy. Stems erect, 3–4 in. long, slender, creeping at the base from bulbs $\frac{1}{4}$ in. in diam. Flowers rather large for the genus. Otherwise as *C. hirsuta*.—C. B. Clarke in DC. Monogr. Phan. iii. 256; Durand & Schinz, Conspect. Fl. Afr. v. 435; Engl. Hochgebirgsfl. Trop. Afr. 156. *Zygomenes parasitica*, Hassk. in Schweinf. Beitr. Fl. Aethiop. 214.

Nile Land. Abyssinia: Samen; Acallo-Meda, 10,500 ft., *Schimper*, 506!

The type specimens of *C. parasitica* are very complete, and show that the plant is not parasitic; its small bulbs were clustered in earth—probably in the fork of a tree.

3. **C. angusta,** *C. B. Clarke in DC. Monogr. Phan.* iii. 260. Hairy. Stems 4–8 in. long, slender, erect from a bulb $\frac{3}{4}$ in. in diam. Leaves up to 3 by $\frac{1}{12}$ in., linear. Heads $\frac{1}{2}$–$\frac{2}{3}$ in. long, of 1 or few cymes, very oblique; the lower bract often 1 in. long, linear from an oblique lanceolate base. Flowers small, the bracts crowded in 2 rows, shaggy.—Durand & Schinz, Conspect. Fl. Afr. v. 433.

Upper Guinea. Niger Territory: Nupe, on rocky soil, *Barter*, 1476.

Lower Guinea. Congo Free State: Lower Congo; Kisantu, on the Inkissi River, *Gillet!*

4. **C. fœcunda,** *Hassk. Commel. Ind.* 110. More or less shaggy. Stems 6–14 in. long, weak, rising obliquely from bulbs $\frac{1}{4}$–$\frac{1}{3}$ in. in diam. Leaves $2\frac{1}{2}$ by $\frac{1}{2}$ in. or (as in K. Schumann's plant) much smaller, oblong-lanceolate, not narrowed into a pseudo-petiole at the base. Inflorescences numerous, hardly $\frac{1}{3}$ in. long, quite or nearly included in the leaf-sheaths; bracts not (or obscurely) 2-seriate.—C. B. Clarke in DC. Monogr. Phan. iii. 255; Durand & Schinz, Conspect. Fl. Afr. v. 433; K. Schum. in Engl. Pfl. Ost-Afr. C. 137. *C. montana*, K. Schum. in Engl. Hochgebirgsfl. Trop. Afr. 156; Durand & Schinz, Conspec. Fl. Afr. v. 434. *Commelina fœcunda*, Hochst. ex C. B. Clarke in DC. Monogr. Phan. iii. 255.

Nile Land. Eritrea: Plain of Keren, *Steudner*, 1485. Abyssinia: Serraba, in Uschan, 5000–6000 ft., *Schimper*, 459! Samen, *Schimper*, 1242! Berrechowa, 5200 ft., *Schimper*, 280!

Mozamb. Dist. German East Africa: Unyamwezi district (ex *K. Schumann*); Usambara; Duga, *Holst*, 3163! British Central Africa: Matabeleland, *Elliott!*

Also in Arabia.

K. Schumann notes that this species belongs to the sect. *Ochreæfloræ* as defined in DC. Monogr. Phan. iii. 244. This is so. But, from the bulbous roots, I think still that its true affinity is here.

5. **C. lanata,** *Benth. in Hook. Niger Fl.* 542. Annual, with woolly fine hair, persistent about the bracts. Stems 4–18 in. long, often erect, slender, much divided, sometimes thicker and decumbent at the base, rooting at the nodes. Leaves up to 3 by $\frac{1}{3}$ in. (often much smaller) narrowly oblong-lanceolate. Inflorescences scattered, axillary and peduncled, often numerous, of 1–4 clustered cymes, $\frac{1}{4}$–$\frac{2}{3}$ in. in diam.; outermost bract usually $\frac{1}{2}$–1 in. long, similar to the leaves but widened at the base; bracts falcate in 2 rows in the cymes of Bentham's type, but densely packed and very obscurely 2-ranked in the nodose heads in Schweinfurth's.—C. B. Clarke in DC. Monogr. Phan. iii. 258, incl. both varieties; Durand & Schinz, Conspect. Fl. Afr. v. 434; Schoenl. in Engl. & Prantl, Pflanzenfam. ii. 4, 67; Rendle in Journ. Linn. Soc. xxx. 431, and in Cat. Afr. Pl. Welw. ii. 80 (incl. both varieties); K. Schum. in Engl. Pfl. Ost-Afr. C. 137; Hua in Bull. Mus. Hist. Nat. Par. i. 122 (incl. var. *sublanata*). *C. Schweinfurthii*, Hassk. Commel. Ind. 134, and in Schweinf. Beitr. Fl. Aethiop. 295. *C. barbata*, Schweinf. Fl. Aethiop. 295 partly, not of D. Don. *Cyanopogon sp.*, Schweinf. ex C. B. Clarke in DC. Monogr. Phan. iii. 258.

Upper Guinea. Senegambia, *Heudelot*, 276! Senegal, *Bellamy*, 8, 639, 665. Sierra Leone, *Afzelius! Morson!* Dahomey, *Menager*. Lagos: Abeokuta, a weed in Yam ground, *Millen*, 100! *Irving*, 101! Yoruba, *Millson!* Niger Territory: Nupe, *Barter*, 1475! Jeba, on the Niger, *Barter!* Lower Niger: Patteh Mountain, *Vogel*, 183! Quorra (River Niger), *Vogel*, 122! Cameroons: Yaunde, 2600 ft., *Zenker & Staudt*, 502!

Nile Land. Gallabat: region of Matamma, *Schweinfurth*, 534! 535! British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2334! Bongo; Gurfala, *Schwein-*

furth, 2246! Ukamba, 5000–6000 ft., *Scott-Elliot*, 6483! Giryama and Shimba Hills, near Mombasa, *Taylor*.

Lower Guinea. Angola: Pungo Andongo; on the highest rocks of the Præsidium, Cazella, San Antonio, and Songue, *Welwitsch*, 6650! on rocks between Candumba and Mangue, *Welwitsch*, 6653! and without precise locality, *Welwitsch*, 6648!

Mozamb. Dist. German East Africa: Masai Highlands (ex *K. Schumann*). Portuguese East Africa: Lower Zambesi; opposite Sena, *Kirk*, 246! British East Africa: Nyasaland, *Buchanan*, 903!

The var. *sublanata* (C. B. Clarke in DC. Monogr. Phan. iii. 258) is only the ordinary plant with the wool more rubbed off than usual. The var. *Schweinfurthii* (C. B. Clarke, l.c.), i.e., Schweinfurth, 534, 535, 2334, has the heads of flowers much included in the leaf-sheaths.

6. **C. pauciflora,** *A. Rich. Tent. Fl. Abyss.* ii. 345. Annual, with some arachnoid wool. Stems erect, 4 in. high. Leaves linear-lanceolate to linear. Inflorescences terminal and axillary, much included in the sheaths of the floral leaves; cymes small, of 1–4 pairs of 2-ranked bracts. —Hassk. Commel. Ind. 121, and in Schweinf. Beitr. Fl. Aethiop. 295; C. B. Clarke in DC. Monogr. Phan. iii. 256; Durand & Schinz, Conspect. Fl. Afr. v. 435; Martelli, Fl. Bogos. 88. *Zygomenes pauciflora*, Hassk. in Schweinf. Beitr. Fl. Aethiop. 213.

Nile Land. Eritrea: on Mount Deban, near Keren, 4580–5500 ft., *Beccari*, 262. Abyssinia: Tigre; Mount Sholoda, near Adowa, *Quartin-Dillon!* Shireh province, *Quartin-Dillon!*

It may be doubted whether this species is other than a depauperated form of *C. lanata*, Benth., var. *Schweinfurthii*, C. B. Clarke.

7. **C. longifolia,** *Benth. in Hook. Niger Fl.* 543, *not of Wight.* Shaggy or glabrate. Stem abrupt at the base; roots thick, somewhat clavate. Central stem very short, sterile, with 3–8 leaves, 6 by $\frac{1}{2}$ in., very narrowly lanceolate, or linear. Flowering stem lateral, arising close to the crown of the root, 8–12 in. long, carrying 2–1 (or no) leaves. Inflorescences 2 or 1, $\frac{3}{4}$ in. broad, of 4–1 cymes; floral leaves (outermost bracts) 1–3 in. long, linear-lanceolate; flower-bracts 2-ranked. —T. Thoms. in Speke, Nile, Append. 650; Baker in Trans. Linn. Soc. xxix. 163; C. B. Clarke in DC. Monogr. Phan. iii. 259 excl. var. γ *cæspitosa*; Durand & Schinz, Conspect. Fl. Afr. v. 434 excl. var. γ; Schoenl. in Engl. & Prantl, Pflanzenfam. ii. 4, 67; K. Schum. in Engl. Pfl. Ost-Afr. C. 137; Schweinf. in Hoehnel, Zum Rudolph-See u. Stephanie-See, ii. 353; Rendle in Cat. Afr. Pl. Welw. ii. 80.

Nile Land. British East Africa: Unyoro district (ex *K. Schumann*); Leikipia; upper course of the Guaso Narok, 6500 ft. (ex *Schweinfurth*).

Lower Guinea. Congo; *Curror*, 1! Angola: Huilla; in damp rocky pastures, 3800–5500 ft., *Welwitsch*, 6595! Pungo Andongo; in damp rocky pastures on the Præsidium, *Welwitsch*, 6651!

Mozamb. Dist. German East Africa: Unyamwezi; between Tura and Tabora, 3800 ft., *Speke & Grant!* British Cental Africa: Kambole, south-west of Lake Tanganyika, 5000 ft., *Nutt!*

The citations of Schweinfurth and K. Schumann are of their names only—their plants not having been seen. It is not improbable that these authors identified their

plants as *C. longifolia,* Benth., var. *cæspitosa,* C. B. Clarke; which I now think a distinct species, i.e., *C. cæspitosa,* Kotschy & Peyr., n. 10 below.—The var. *β bakeriana,* C. B. Clarke (in DC. Monogr. Phan. iii. 259), is more glabrous with larger leaves than in Bentham's type; in Nutt's plant the leaves attain 12 by $\frac{1}{4}$ in., and are glabrate.

8. **C. polyrrhiza,** *Hassk. Commel. Ind.* 150. Moderately villous, becoming glabrate. Roots many, thick, long; on the crown of the roots (or shortened sterile stem) is the central tuft of leaves; these leaves 2 by $\frac{1}{3}$ in., lanceolate. Lateral flowering stems 4–5, 3–5 in. long, frequently divided, with 3–5 heads of flowers, and smaller leaves; outermost bracts to the terminal heads $\frac{1}{2}$ in. long, ovate; bracts of the cymes obscurely (or not conspicuously) 2-ranked.—Hassk. in Schweinf. Beitr. Fl. Aethiop. 295; C. B. Clarke in DC. Monogr. Phan. iii. 255; Durand & Schinz, Conspect. Fl. Afr. v. 435. *Zygomenes polyrrhiza,* Hassk. in Schweinf. Beitr. Fl. Aethiop. 214.

Nile Land. Abyssinia: Samen; Acallo-Meda, 10,500 ft., *Schimper,* 504!

9. **C. djurensis,** *C. B. Clarke in DC. Monogr. Phan.* iii. 256. Young parts villous and with white wool, but the whole plant becomes nearly glabrate. Roots thick. Sterile central stem short; leaves on this attaining 10 by $\frac{1}{2}$ in., linear. Lateral flowering stems 12–20 in. long, rather robust, with 2 or 3 heads of flowers and 2–0 leaves (besides the outermost bracts to these heads). Stem leaves attaining 6 in. in length, linear. Heads of several clustered cymes, $\frac{1}{2}$–1 $\frac{1}{4}$ in. broad; outermost bracts to the terminal heads 2–3 in. long, linear. Bracts to the cymes distinctly 2-ranked.—Durand & Schinz, Conspect. Fl. Afr. v. 433.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth,* 1944! ser. iii. 217!

10. **C. cæspitosa,** *Kotschy & Peyr. Pl. Tinn.* 48. Leaves and stems villous, becoming glabrate. Stems abrupt at the base, with slender wiry roots. Basal leaves tufted, up to 3 by $\frac{1}{3}$ in., oblong-lanceolate, usually persistently shaggy near the base beneath. Flowering stem 8–12 in. long, slender, erect, scapose, with 2–6 heads of flowers. Leaves on the flowering stem 1 or 0 (besides the floral leaves), reduced to sheaths with a leafy triangular point hardly $\frac{1}{4}$ in. long. Flower-heads hardly $\frac{1}{2}$ in. long, of 1 or few cymes, usually very oblique; outermost bracts $\frac{1}{2}$–1 in. long, lanceolate, falcate; bracts in the cymes conspicuously 2-ranked, hairy.—Schweinf. Beitr. Fl. Aethiop. 295. *C. longifolia,* var. *cæspitosa,* C. B. Clarke in DC. Monogr. Phan. iii. 259; Durand & Schinz, Conspect. Fl. Afr. v. 434. *Zygomenes cæspitosa,* Kotschy & Peyr. Pl. Tinn. t. 22 A.

Upper Guinea. Niger Territory: Nupe district; Ilorin, *Barter,* 3440!

Nile Land. British East Africa: Bongo; Gir, *Schweinfurth,* 1811! Nandi Hills, 6000–7000 ft., *Scott-Elliot,* 6911!

The flowers, according to Barter's label, are red.

11. **C. nodiflora,** *Kunth, Enum.* iv. 106. With spreading hair usually prominent. Flowering stems 8–18 in. long, robust, with well-

developed leaves, and 2–3 heads of flowers, oblique at the base, sometimes rooting at the lower nodes; roots wiry, occasionally thickened at the tips. Leaves on the flower stems attaining 4 by $\frac{1}{2}$–$\frac{2}{3}$ in., usually persistently hairy; those of the basal tuft often larger, sometimes 9 by 1 in. Heads usually sessile, often $\frac{3}{4}$–1 in. broad, very dense, with several cymes; outermost bract 1–$1\frac{1}{2}$ in. or more, falcate linear-oblong from a broadly ovate base; bracts in the cymes crowded, apparently irregularly.—Bot. Mag. t. 5471; C. B. Clarke in DC. Monogr. Phan. iii. 257, and in Dyer, Fl. Cap. vii. 14, with all synonyms; Durand & Schinz, Conspect. Fl. Afr. v. 435; Schoenl. in Engl. & Prantl, Pflanzenfam. ii. 4, 67, fig. 36 A; K. Schum. in Engl. Pfl. Ost-Afr. C. 137; Martelli, Fl. Bogos. 88; Rendle in Cat. Afr. Pl. Welw. ii. 80.

Nile Land. Eritrea: Keren, 4500 ft., *Beccari.*

Mozamb. Dist. German East Africa: Unyamwezi; Uyui, *Taylor!* Usambara; Mlalo (ex *K. Schumann*). British Central Africa: Urungu; Fwambo, *Carson*, 32; Nyasaland; Mount Zomba, 4000–6000 ft., *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!* Rhodesia; Inyanga Mountains, 6000–7000 ft., *Hon. Mrs. Evelyn Cecil*, 211!

Frequent in South Africa.

12. **C. Mannii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 258. Hair scattered, shaggy. Growing in water; stem oblique at the base with many slender fibrous roots. Stems 2–12 in. long, much branched, with 3–21 heads, the internodes often curved, much grooved and distinctly quadrangular under the nodes. Basal leaves not seen; stem leaves 2–4 by $\frac{1}{3}$ in., linear-oblong to linear. Heads $\frac{1}{4}$ to $\frac{1}{2}$ in. broad, of 1–4 clustered cymes; outermost bract ovate or ovate-oblong, scarcely longer than the heads. Cymes few-flowered, the falcate hairy bracts 2-ranked. —Engl. Hochgebirgsfl. Trop. Afr. 156; Durand & Schinz, Conspect. Fl. Afr. v. 434; Rendle in Cat. Afr. Pl. Welw. ii. 80. *C. abyssinica*, Hook. f. in Journ. Linn. Soc. vi. 21, not of A. Rich. *Cyanopogon*, gen. nov., Welw. ex C. B. Clarke in DC. Monogr. Phan. iii. 258.

Upper Guinea. Cameroons: Cameroon Mountain, 7000–9000 ft., *Johnston*, 34! *Mann*, 1310! 2140! Buea, *Preuss*, 800! Fernando Po: Clarence Peak, 9000 ft., *Mann*, 616!

Lower Guinea. Angola: Pungo Andongo; in wooded places near Mangue and Mutollo, 2400–3800 ft., *Welwitsch*, 6652!

13. **C. somaliensis,** *C. B. Clarke in Kew Bulletin*, 1895, 229. Shaggy. Stem woody and abrupt at the base, with slender wiry roots. Basal leaves $1\frac{1}{2}$ in. long, narrowly triangular. Flowering stem 4–9 in. long, rather stout, undivided, with several leaves, and 2–8 axillary heads hardly exserted from the leaf-sheaths. Stem leaves 1 by $\frac{1}{4}$–$\frac{1}{3}$ in., the upper (with axillary heads) shortened. Flower heads dense, the bracts to the cymes appearing irregularly clustered.

Nile Land. Somaliland: Golis Range; Hammar, *Miss Edith Cole!* Darra-as *Mrs. Lort-Phillips!* Halrawal, *Donaldson Smith!* British East Africa: Ruwenzori, 6000–7000 ft., *Scott-Elliot*, 7813A!

The lower heads of flowers are included in the leaf-sheaths, the uppermost quite

exserted. The sect. *Ochreæflora* (DC. Monogr. Phan. iii. 244) is not a section—but a group of species with undefined limits. Scott-Elliot's examples are incomplete, and are less shaggy than the type specimens; but they must be either *C. somaliensis*, or a species closely allied thereto.

14. **C. flexuosa,** *C. B. Clarke.* Glabrescent. Roots fibrous. Stem procumbent, rooting at the lower nodes, with very numerous stout branches attaining 20 in. long, with flexuose internodes. Leaves oblong-lanceolate, attaining 2 in. long, the upper by degrees shortened into the floral leaves, which are ovate abbreviated into a short narrow recurved tip. Inflorescences axillary, very numerous, nearly included in the leaf sheaths; bracts not appearing 2-ranked.—*C. nodiflora*, var. *β madagascarica*, C. B. Clarke in DC. Monogr. Phan. iii. 258 partly; Durand & Schinz, Conspect. Fl. Afr. v. 435; Rendle, Cat. Afr. Pl. Welw. ii. 80. *Commelina flexuosa*, Welw. ex C. B. Clarke in DC. Monogr. Phan. iii. 258.

Lower Guinea. Angola: Huilla; Monino, in damp rocky places, very rare, 3800–5500 ft., *Welwitsch*, 6584!

This is more remote from *C. nodiflora* than is the Madagascar plant with which it was united in DC. Monogr. Phan. l.c.

Imperfectly known species.

15. **C. Dybowskii,** *Hua in Bull. Mus. Hist. Nat. Par.* i. 122. Hirsute. Stem simple, rather large, erect. Leaves linear, the upper surface glabrous, the lower hairy. Cymes at the apex of the stem or of axillary branches, several, approximate, nearly sessile; bracts similar to the leaves, or shorter; bracteoles up to 20, falcate, hairy.

Upper Guinea. French Congo; Kemo Station, *Dybowski*, 760.

Not seen. Hua compares it with *C. djurensis*; he does not describe, and probably did not possess, the root. There is a *Cyanotis* from Mount Elphinston Flemming, on the Kworra (Niger), Barter, 492, wrongly referred by me to *C. lanata*, Benth. (in DC. Monogr. Phan. iii. 258). The root of this is not known, but the portion seen of the robust stems is 18 in. long, little divided, the stem-leaves $4\frac{1}{2}$ by $\frac{1}{2}$ in. It is certainly not *C. lanata*, Benth., and had been removed to the neighbourhood of *C. djurensis*. So far as the description goes, it might be *C. Dybowskii*, Hua.

16. **C. cephalotes,** *Fenzl ex Schweinf. Beitr. Fl. Aethiop*, 295; Durand & Schinz, Conspect. Fl. Afr. v. 435.

Nile Land. Sennaar (ex *Fenzl*).

(? This appears to be a bare name; at least, Durand cannot find where it is described.

10. **FLOSCOPA**, Lour.; Benth. et Hook. f. Gen. Pl. iii. 852.

Sepals 3, oblong to obovate. Petals 3, obovate, sessile or scarcely clawed, distinct. Stamens 6 (rarely 5), perfect; filaments without hairs. Ovary 2-celled, with 1 ovule in each cell. Capsule obovoid, compressed, membranous, loculicidally 2-valved, 2-seeded. Seeds solitary, attached laterally, hemispheric or depressed conic.—Stems all bearing leaves. Inflorescence hairy and often glandular, of many flowers in a terminal more or less leafy panicle; upper part of the

panicle with minute or no bracts (in *F. axillaris* the panicles are mainly axillary); ultimate branches of the panicle bearing 2 rows of very short-pedicelled flowers, are defined by Bentham as "1-sided, not scorpioid cymes"; bracts at the base of the pedicels minute or 0. Corolla from purple to rose-colour except in *F. flavida;* colour unknown in *F. Schweinfurthii* and *F. tuberculata*, which are allied to *F. flavida*.

Species 15, very closely allied, found in the hotter parts of Africa, Asia, and America.

Stems 1–2 ft. long, rather stout (except in *F. axillaris* and *F. Mannii*), decumbent and often rooting at the base, scarcely ever branched.
Leaves quasi-petioled, i.e., much contracted above the sheath.
Leaves oblong-lanceolate . . . . . 1. *F. africana*.
Leaves elliptic, with triangular tip . . . 2. *F. Mannii*.
Leaves sessile on the leaf-sheaths.
Leaves 1–4 in. long.
Seeds with ribs radiating from the embryostega 3. *F. rivularis*.
Seeds smooth, without ribs . . . . 4. *F. glomerata*.
Leaves $\frac{1}{2}$ in. long . . . . . 5. *F. axillaris*.
Stems 3–10 in. long, erect, annual, often branched (except *F. tuberculata*).
Leaves elliptic . . . . . 6. *F. Schweinfurthii*.
Leaves oblong . . . . . 7. *F. tuberculata*.
Leaves narrowly lanceolate . . . . . 8. *F. flavida*.

1. **F. africana,** *C. B. Clarke in DC. Monogr. Phan.* iii. 267. Sparingly hairy, except the inflorescence. Stem 8–24 in. long, scarcely divided (except the inflorescence), decumbent at the base, rooting from the nodes. Leaves up to $3\frac{1}{2}$ by $\frac{3}{4}$ in., lanceolate, acuminate, tapering at the base into a pseudo-petiole often $\frac{1}{5}$ in. long. Panicle terminal, oblong (often 4–6 by $\frac{1}{4}$ in.) with numerous flowers (but see var. β); upper part without leaves or bracts; viscid-pubescent not very hairy; ultimate cymes often $\frac{1}{2}$–$\frac{3}{4}$ in. long. Capsule about $\frac{1}{12}$ in. long; seeds with radiating ribs.—Durand & Schinz, Conspect. Fl. Afr. v. 435, and Études Fl. Congo i. 271; Durand & De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 87; Hua in Bull. Mus. Hist. Nat. Par. i. 122. *Aneilema africanum*, Beauv. Fl. Owar. ii. 57, t. 93, fig. 1. *Commelina Chantransia*, Roem. & Schultes, Mant. i. Addend. i. 376.

Upper Guinea. Sierra Leone: in mud, near Regent, *Scott-Elliot*, 3918! Lomaburn, near the River Scarcies, *Scott-Elliot*, 5030! Lagos: by streams at Agagee, *Millen*, 2! 95! by water, Koboro, *Millen*, 154! Benin, *Beauvois!* Cameroons; Batanga, near the River Lobe, *Bates*, 183! Bipinde, *Zenker*, 1219! Yaunde, 2750 ft., *Zenker & Staudt*, 143!

Lower Guinea. Gaboon: Gaboon River, *Mann*, 1022! Munda; Sibange Farm, *Soyaux*, 357! French Congo: Ogowe River, *Thollon*, 240, 276; Lower Congo: Lispa, 1000 ft., *Hens, C.*, 168! Bingila, *Dupuis!*

Var. β *majuscula*, B. C. Clarke. Stems stouter; leaves attaining 4–6 in. long; panicle 5–6 by 4 in., ovoid, ultimate cymes often 2 in. long; capsules rather larger.

Upper Guinea. Lagos, *Millen*, 97! *Punch!* Cameroons: Yaunde, 2600 ft. *Zenker & Staudt*, 143!

This does not match the typical *F. africana*, but the points of difference are trivial.

2. **F. Mannii,** *C. B. Clarke in DC Monogr. Phan.* iii. 268. Fragments of stems 4–7 in. long, undivided, rooting from the lower nodes, glabrate. Leaves $2\frac{1}{2}$ by $1\frac{1}{8}$ in., elliptic, when mature nearly glabrous, the leaf-sheaths shaggy; tip shortly triangular, not acuminate; base triangular on a quasi-petiole $\frac{1}{6}$–$\frac{1}{4}$ in. long. Panicle terminal, $1\frac{1}{2}$ in. long and broad, thin, subdichotomously branched, sparingly pubescent, much overtopped by the upper leaves; cymes small, with small flowers and capsules.—Durand & Schinz, Conspect, Fl. Afr. v. 436.

Lower Guinea. Spanish Gaboon: Corisco Bay, in wet places, *Mann*, 1867!

This looks very unlike the other species of the genus, but the ripe capsules and seeds are those of *Floscopa*.

3. **F. rivularis,** *C. B. Clarke in DC. Monogr. Phan.* iii. 267, *incl. var.* β. Stems 1–2 ft. long, rather robust, glabrate, not or scarcely divided, decumbent and rooting at the base. Leaves 2–4 by $\frac{1}{3}$–$\frac{2}{3}$ in., oblong-lanceolate, acute, glabrate, sessile on the sheaths. Panicle 1–$2\frac{1}{2}$ in. long, dense, with much brown hair, exserted above the uppermost leaves. Capsule $\frac{1}{10}$–$\frac{1}{8}$ in. long. Seeds of the genus, conical depressed, with ribs radiating from the embryostega, sometimes densely covered with white circular short-stalked glandular discs (which wear off more or less), sometimes black, with reticulated hexagonal cells, and no (or few) glands.—Durand & Schinz, Conspect. Fl. Afr. v. 436; Engl. Hochgebirgsfl. Trop. Afr. 157 (incl. var. β); K. Schum. in Engl. Pfl. Ost-Afr. C. 137; Hua in Bull. Mus. Hist. Nat. Par. i. 122. *Aneilema rivulare,* A. Rich. Tent. Fl. Abyss. ii. 342. *Lamprodithyros rivularis,* Hassk. in Schweinf. Beitr. Fl. Aethiop. 211, 295; Baker in Trans. Linn. Soc. xxix. 163. *Dithyrocarpus* sp., T. Thoms. in Speke, Nile, Append. 650.

Nile Land. Abyssinia: Shireh; near Kouaieta, *Quartin-Dillon!* by the Addo-Hohot stream, in the valley of the River Mareb, *Quartin-Dillon!* Wojerat district, *Quartin-Dillon!* Begemeder; Senka Berr, on the River Reb, and Plains of Dembea, north of Lake Tana, 6000–8000 ft., *Schimper,* 1226! British East Africa: Bongo; between Dugu and Duggudu, *Schweinfurth,* 2099! Duggudu, *Schweinfurth,* 2269! Dar Fertit: Nguggu (? Nduggu), *Schweinfurth,* ser. iii., 212! Ukidi (Unyoro), *Speke & Grant!* Ukamba, 5000 ft., *Scott-Elliot,* 6918!

Upper Guinea. Senegal, *Bellamy,* 193 (ex Hua).

Mozamb. Dist. German East Africa: Masai Highlands and Region of the Great Lakes, up to 8000 ft. (ex *K. Schumann*); Wadiboma (? Kwadiboma), *Fischer,* 597! British Central Africa: Urungu; Fwambo, 5250 ft., *Carson,* 39! *Nutt!* Nyasaland; Tanganyika Plateau at Fort Hill, 3500–4000 ft., *Whyte!* Masuka Plateau, 6500–7000 ft., *Whyte!* Kondowe to Karonga, 2000–6000 ft., *Whyte!* Shire Highlands, *Buchanan,* 333! Zomba, 5000 ft., *Kirk!* and without precise locality, *Buchanan,* 818!

4. **F. glomerata,** *Hassk. Commel. Ind.* 166. Seeds without radiating ribs from the embryostega; otherwise as *F. rivularis.*—C. B. Clarke in DC. Monogr. Phan. iii. 267, and in Dyer, Fl. Cap. vii. 15; Durand & Schinz, Conspect. Fl. Afr. v. 436; K. Schum. in Engl. Pfl. Ost-Afr. C. 137; Rendle in Trans. Linn. Soc. ser. 2, Bot. iv. 53, and in Cat. Afr. Pl. Welw. ii. 80. *Tradescantia glomerata,* Roem. &

Schultes, Syst. Veg. vii. 1175. *Dithyrocarpus glomeratus*, Kunth, Enum. iv. 78.

Lower Guinea. Angola: Pungo Andongo; in wooded marshes at Sobato de Quibanga and near Quilunga, *Welwitsch*, 6631! Huilla; in Lake Ivantala, about the mouth of the River Moambo, growing 4–10 ft. high, in deep water, *Welwitsch*, 6590!

Mozamb. Dist. British Central Africa: on an island at Victoria Falls, *Kirk!* Nyasaland; Zomba, *Whyte!*

Frequent in South extratropical Africa and the Mascarene Islands.

I doubt if this species can be kept distinct from *F. rivularis*.

5. **F. axillaris,** *C. B. Clarke in DC. Monogr. Phan.* iii. 268. Nearly glabrous, except the inflorescence. Appears to be an annual. Base of stem procumbent, rooting copiously from many nodes, whence spring clusters of weak stems 2–5 in. long, obliquely erect, very leafy. Leaves $\frac{1}{2}$–1 in. long, elliptic or lanceolate, acute. Panicles terminal, and terminal on short axillary branches, pubescent. Ultimate branches of the inflorescence nearly 1 in. long, with numerous small flowers. Pedicels hardly $\frac{1}{20}$ in. long; bracts at their base $\frac{1}{16}$ in. long, ovate. Capsule and seeds of the genus.—Durand & Schinz, Conspect. Fl. Afr. v. 436. *F. aquatica*, Hua in Bull. Mus. Hist. Nat. Par. i. 122 (from description). *Polygala axillaris*, Poir. Encycl. v. 489.

Upper Guinea. Senegal, *Perrottet*, 771! Sierra Leone, *Smeathman! Afzelius!* Guinea, *Smith!*

6. **F. Schweinfurthii,** *C. B. Clarke in DC. Monogr. Phan.* iii. 269. A thinly hairy annual. Stems 6–8 in. high, erect, repeatedly branched from the base. Leaves 2 by $\frac{3}{4}$ in., ovate-lanceolate, sessile. Panicles terminal, more or less leafy, 1–$2\frac{1}{2}$ in. in diam.; cymes often 1–$1\frac{1}{2}$ in. long, villous, dense with flowers; pedicels 0–$\frac{1}{8}$ in. long. Capsule small, $\frac{1}{16}$ in. long; seeds radiately ribbed.—Durand & Schinz, Conspect. Fl. Afr. v. 436.

Nile Land. British East Africa: Bongo; Sabbi, *Schweinfurth*, 2648! Kulongo, *Schweinfurth*, 2672!

7. **F. tuberculata,** *C. B. Clarke.* A thinly hairy annual. Stems 6–8 in. high, erect, undivided. Leaves $2\frac{1}{2}$ by $\frac{1}{2}$–$\frac{2}{3}$ in., oblong, sessile. Panicles terminal, 2 in. long and broad, not leafy, rusty-hispid. Cymes $1\frac{1}{2}$ in. long and upwards, dense; pedicels very short. Capsule $\frac{1}{12}$ in. long; seeds apparently coarsely tubercled, the radiating ribs being interrupted by few deep depressions.

Mozamb. Dist. British Central Africa: Nyasaland; Tanganyika Plateau at Fort Hill, *Whyte!*

A close ally of *F. Schweinfurthii*.

8. **F. flavida,** *C. B. Clarke in DC. Monogr. Phan.* iii. 269. A slightly hairy, weak annual. Stem $1\frac{1}{2}$–5 in. long, erect, frequently branched from the base. Leaves up to $2\frac{1}{2}$ by $\frac{1}{3}$ in. and linear-lanceolate in the Niger plant, or $2\frac{1}{2}$ by $\frac{1}{3}$ in. and lanceolate in the Djur examples, sessile. Panicles terminal, slender, of few cymes, not leafy; cymes $\frac{1}{2}$–$1\frac{1}{2}$ in.

long, dense; pedicels 0–$\frac{1}{20}$ in. Calyx pubescent, purple (*Schweinfurth*). Corolla yellow (*Schweinfurth*). Capsule small; seeds minute, obscurely ribbed.

Upper Guinea. Niger Territory: Borgu; near the town of Fakun, in swamps, *Barter*, 760!

Nile Land. British East Africa: Jur; Agada, near Jur Ghattas, *Schweinfurth*, 2537! Abu Guroon's Scriba, *Schweinfurth*, 4286!

Mozamb. Dist. British Central Africa: Nyasaland; 3000–6000 ft., Tanganyika Plateau, at Fort Hill, *Whyte!*

Imperfectly known species.

9. **F. pauciflora,** *C. B. Clarke.* Nearly glabrous, except the inflorescence and the mouths of the leaf-sheaths. Portions of stems seen up to 10 in. long, slender, nearly undivided. Leaves up to $2\frac{1}{4}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., narrowly lanceolate, sessile. Inflorescence terminal, attaining $1\frac{1}{4}$ by $\frac{2}{3}$ in. at most, very loose, open, with at most 20 flowers (in some cases the inflorescence is a small cyme of 6 flowers). Flowers very small. Sepals rusty sticky-pubescent. Capsule small, shining white, probably 2-seeded.

Upper Guinea. Sierra Leone; Samu, *Scott-Elliot*, 5030!

From the rusty hairy sepals this must be a *Floscopa;* and, if a *Floscopa*, it must be a new species, unless it is a depauperated state of *F. glomerata;* but the species is founded on very slender material.

10. **F. Elliottii,** *C. B. Clarke.* Annual, nearly glabrous, except the inflorescence. Stems erect, 2–4 in. long, branched. Leaves 1 by $\frac{1}{4}$–$\frac{1}{3}$ in., ovate-oblong, sessile, sheaths very short. Panicle terminal, subdichotomous, of few very long loose cymes (many 2 in. long); bracteoles minute or 0; pedicels 0–$\frac{1}{20}$ in. Capsule small, of the genus. Seeds with strong ribs radiating from the embryostega.

Upper Guinea. Sierra Leone: in marshes near Kitchom, Scarcies River, *Scott-Elliot*, 4340!

Order CXLIV. **RAPATEACEÆ.** (By N. E. Brown.)

Flowers hermaphrodite, regular. Perianth-segments 6, all petaloid and connate below into a long slender tube, or in 2 series; the 3 outer forming a calyx, connate at the base into a short hyaline tube or quite free, paleaceous or slightly rigid; the 3 inner petaloid, connate into a tube below. Stamens 6, inserted in the throat of the corolla-tube; filaments short; anthers 4-celled, the cells confluent above and opening by one introrse oblique pore at the apex. Ovary superior, obtuse, retuse or 3-lobed, perfectly or imperfectly 3-celled; style terminal or arising between the lobes of the ovary. Ovules 1–8 in each cell of the ovary, erect from the base, or laterally affixed to the axis, anatropous. Capsule 3-valved, with the valves septiferous along the middle, or by abortion 1-celled and 1-seeded. Seeds ovoid, oblong or subglobose; testa rather thick, smooth or minutely reticulate-striate, sometimes produced

at the apex into a short conical or mitre-like appendage; albumen copious, mealy; embryo lenticular, seated on the albumen near the hilum.—Perennial marsh herbs of robust habit, with short thick rhizomes. Leaves all radical, usually more or less distichous; sheaths well developed, conduplicate; blades elongate, broadly linear-lanceolate or oblong, sessile on the sheath or distinctly petiolate, with numerous parallel veins. Flowers in dense heads involucrate by two large bracts, or in a unilateral spike enclosed in a spathe, usually on long peduncles, or (in the African species) very shortly pedunculate or subsessile in the axils of the leaves; each flower surrounded by numerous bracts, which sometimes form an involucre resembling that of the *Compositæ*.

A small order of 7 genera and about 24 species, all natives of Tropical America, except the following.

1. **MASCHALOCEPHALUS**, Gilg & K. Schum. in Engl. Jahrb. xxviii. 148.

Flowers hermaphrodite, regular. Perianth with an elongated tube and 6 subequal lobes. Stamens 6, inserted on the tube of the perianth; anthers linear, rounded at the base, tapering towards the apex, opening by introrse pores at the apex, 4-celled, the 2 inner cells about $\frac{1}{3}$ shorter than the outer. Ovary 3-celled; style elongated; ovules solitary in each cell, affixed near the base of the axile placenta, erect. Capsule triangular, shortly apiculate, faintly striate. Seed ellipsoid, acute at both ends, with an elongated gibbosity above the hilum; testa smooth, thinly punctulate, milk-white, provided with a radiating fibrous yellow appendage or callus at the apex; albumen copious; embryo very small.—Marsh herbs of tufted habit. Leaves alternate, hard, somewhat rigid, densely crowded, linear-lanceolate, sheathing at the base. Flowers in heads in the axils of the leaves.

An endemic genus of 1 species, which I have not seen.

1. **M. Dinklagei,** *Gilg & K. Schum. in Engl. Jahrb.* xxviii. 148. A tufted herb. Leaf-sheaths unequally plicate, $4\frac{3}{4}$–$5\frac{1}{4}$ in. long, 7 lin. broad at the base, narrowing to about 2 lin. broad where they pass into the blades, which are about 16 in. long, 14 lin. broad, linear-lanceolate, tapering towards both ends, very acute, many-nerved. Inflorescence about $\frac{3}{4}$ in. long. "Capitulum sessile in the axils of the leaves, bracteate at the base, with a few unequal complicate and carinate subulate bracts, pedunculate above the bracts; peduncle thick, triangular, short, almost concealed by the two larger involucrating bracts, many-flowered." Flowers surrounded by many bracteoles. Perianth-tube slender, about $1\frac{1}{2}$ in. long, $\frac{1}{2}$ lin. diam., cylindric; lobes 6, subequal, $5\frac{1}{2}$ lin. long, $2\frac{1}{2}$ lin. broad, very thin and membranous, whitish-yellow.

Upper Guinea. Liberia; in a swamp at Fish Town, Grand Bassa, about 10 ft. above sea-level, *Dinklage*, 2088.

Order CXLV. **FLAGELLARIEÆ.** (By N. E. Brown.)

Flowers hermaphrodite or dicœcious, regular. Perianth 6-partite, persistent; segments small, biseriate, subpetaloid or scarious, slightly unequal. Stamens 6, hypogynous or shortly adnate to the base of the perianth-segments; filaments free; anthers basifixed, introrse, dehiscing by longitudinal slits. Ovary superior, 3-celled, with a solitary anatropous ovule in each cell; style short or none; stigma 3-lobed and sessile, or of 3 linear, spreading branches. Fruit a 1–3-seeded berry. Seeds with a crustaceous testa, and copious farinaceous albumen; embryo minute, lenticular, placed on the outside of the albumen near the hilum.—Herbs of robust habit, with stout stems bearing leaves up to the base of the inflorescence, erect or sarmentose, sometimes climbing by means of tendrils at the tips of the leaves. Leaves alternate, elongated, sheathing at the base, sometimes produced into a tendril at the apex; veins numerous, parallel. Panicle terminal; flowers small, sessile or subsessile.

A small Order of 3 genera, and about 8 species, confined to the warm regions of the Old World. Only 1 species in Africa.

1. **FLAGELLARIA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 860.

Flowers hermaphrodite. Perianth subpetaloid; segments oblong, obtuse, the three outer slightly shorter than the inner. Stamens 6, hypogynous; filaments ultimately long and much exserted. Ovary with a short style and 3 linear stigmas. Berry 1- (rarely 2-) seeded. Seed globose or ovoid, with a crustaceous testa.—Stem sarmentose, climbing by means of the tendril-tipped leaves. Panicle terminal. Flowers small, spicate at the ends of the ultimate branchlets of the panicle.

A small genus of 3 species, one African, one in Fiji, and the third widely dispersed in the tropics of the Old World, but apparently not occurring on the continent of Africa.

1. **F. guineensis,** *Schumach. in Schumach. & Thonn. Beskr. Guin. Pl.* 181. A tall climber, with a moderately stout herbaceous stem. Leaves sheathing; sheath open to the middle, with the thin membranous margins often closely overlapping but never connate at the top; blade $4\frac{1}{2}$–9 in. long, 6–13 lin. broad, elongate-lanceolate, gradually tapering from about the middle into a spiral tendril at the apex, abruptly contracted into a rounded base immediately above the sheath. Panicle terminal, 3–$4\frac{1}{2}$ in. long, 2–4 in. broad, pyramidal, with ascending or spreading branches, the lower subtended by leafy bracts, the upper bractless. Bracteoles minute, hyaline, ovate or suborbicular, obtuse or subacute. Flowers subsessile along the rather slender flexuose or zigzag ultimate branchlets of the panicle, usually with distinct internodes between them, whitish or pale yellowish. Perianth campanulate; segments 1–$1\frac{1}{2}$ lin. long, $\frac{2}{3}$ lin. broad, the 3 outer shorter than the 3

inner, all oblong, obtuse, subpetaloid. Stamens ultimately much exserted; filaments 2–2½ lin. long; anthers linear-oblong, sagittate at the base, 1¼–1⅓ lin. long. Ovary narrow, trigonous; stigmas ⅔–¾ lin. long, linear, rather stout, exserted and recurving over the tips of the perianth-segments. Berries globose, 2–3 lin. diam., bright red.—N. E. Brown in Dyer, Fl. Cap. vii. 16; Rendle in Cat. Afr. Pl. Welw. ii. 81. *F. indica*, T. Thomson in Speke, Nile, Append. 650; Hook. Niger Fl. 540; Oliver in Trans. Linn. Soc. xxix. 163; Engl. Pfl. Ost-Afr. C. 133; Engl. & Prantl, Pflanzenfam. ii. 4, 3; Durand & Schinz, Conspect. Fl. Afr. v. 436; De Wild. & Durand, Contrib. Fl. Congo, i fasc. 2, 64; and of other authors partly, not of Linnæus.

Upper Guinea. Gold Coast: Aquapim (Acropong) Mountains, *Vogel!* Cape Coast Castle, *Vogel*, 14! and without precise locality, *Burton!* Lagos, *Barter*, 20172! Lagos Island, *Barter*, 2216! Cameroons: banks of the Cameroon River, *Mann*, 1! 425!

Nile Land. British East Africa: Mombasa Island, *Hildebrandt*, 1047B!

Lower Guinea. Congo, *Smith!* Angola: Ambriz; on damp wooded hills near the town of Ambriz, *Welwitsch*, 3009!

South Central. Congo Free State: Luvituku, *Luja*.

Mozamb. Dist. German East Africa: Usambara; Doda, *Holst*, 2945! Khutu; banks of the River Mgeta, *Speke & Grant!* Zanguebar, *Kirk!* Portuguese East Africa: near the mouth of the River Shire; at Shamo, *Kirk!* Morambala Hill, *Waller!* and at Shimwara Hills, *Kirk!* Lower Zambesi; Shupanga, *Kirk!*

Also in South Africa.

This has been confused with *F. indica*, Linn., by almost all authors; but, as was pointed out by Schumacher, it may be at once distinguished by the leaf-sheaths being open to about half-way down, although the margins often closely overlap, and also by the slender zigzag axes, along which the flowers are spaced out, with distinct internodes; whilst in *F. indica* the margins of the sheaths of the leaves are connate to the top, forming a closed tubular sheath, and the flowers are usually crowded together into very short subglobose spikes or glomerules, on a rather thick straight axis, without internodes or with extremely short ones.

ORDER CXLVI. **JUNCACEÆ.** (By J. G. Baker.)

Flowers regular, hermaphrodite. Perianth inferior, cut down to the base into 6 subequal biseriate glumaceous segments. Stamens usually 6, hypogynous or attached to the base of the perianth-segments; filaments filiform or flattened; anthers dorsifixed or basifixed, 2-celled, dehiscing longitudinally. Ovary superior, 1–3-celled; ovules anatropous, usually many in a cell; style filiform, simple or trifurcate; stigmas filiform, papillose all over. Fruit capsular, splitting into 3 valves. Seeds ovoid, globose or angled by pressure, rarely compressed; testa thin or moderately thick, pale or black, the thin outer membrane often produced into a tail; albumen copious, firm; embryo small, placed near the hilum.—Perennial or annual herbs, rarely shrubs with a woody caudex. Stem usually leafy only at the base. Leaves terete or linear. Flowers small, usually clustered; bracts minute scariose.

Species 200–250. Cosmopolitan, mainly in temperate regions.

Leaves glabrous. Ovary more or less completely 3-celled, with many ovules in a cell . . . . . 1. JUNCUS.
Leaves hairy. Ovary 1-celled, with 3 nearly basal ovules . 2. LUZULA.

1. **JUNCUS,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 867.

Perianth rigid, cut down to the base; segments subequal, ovate or ovate-lanceolate. Stamens 6, rarely 3, shorter than the perianth, hypogynous or attached to the base of the perianth-segments; filaments filiform or flattened; anthers linear or oblong, basifixed. Ovary sessile, completely or incompletely 3-celled; ovules many in a cell; style short; stigmas 3, filiform or linear, papillose down to the base. Seeds very small, often tailed by the pale outer membrane of the testa being produced beyond the nucleus; albumen copious, firm; embryo minute, placed near the hilum.—Perennial or annual herbs. Leaves flat or terete, sometimes septate, rarely reduced to membranous sheaths. Inflorescence terminal or apparently lateral, panicled or capitate.

Species 170–180. Cosmopolitan, concentrated in the North Temperate zone.

*GENUINI. Leaves all reduced to sheaths. Panicle lateral.
The only Tropical African species . . . . 1. *J. effusus.*

**MARITIMI. Produced leaves few, resembling the stems. Panicle lateral.
The only Tropical African species . . . . 2. *J. maritimus.*

***ARTICULATI. Leaves septate. Inflorescence terminal.
Leaf 1, produced from the middle of the stem . 3. *J. punctorius.*
Leaves 3–5.
Stems all erect . . . . . 4. *J. oxycarpus.*
Stems often long and decumbent . . . 5. *J. Fontanesii.*

****GRAMINIFOLII. Leaves not septate. Inflorescence terminal.
Perennials.
Leaves narrowly linear . . . . . 6. *J. Bachiti.*
Leaves broadly linear . . . . . 7. *J. lomatophyllus.*
Annuals.
Flowers solitary, in forked spikes . . . 8. *J. bufonius.*
Flowers in a terminal cluster . . . . 9. *J. capitatus.*

1. **J. effusus,** *Linn. Sp. Pl.* 326. Perennial. Stems densely tufted on a short creeping rhizome, 2–3 ft. long, green, finely striated, with continuous pith. Leaves all reduced to sheaths, clasping tightly the base of the stems. Panicle dense, lateral, sessile, 1–2 in. diam. Perianth-segments lanceolate, rigid, pale green, $\frac{1}{12}$ in. long. Stamens 3, much shorter than the perianth. Capsule oblong, obtuse, as long as the perianth. Seeds not tailed.—Buchen. in Engl. Jahrb. xii. 228. *J. communis*, var. *effusus*, E. Meyer, Monogr. Junc. 22; Kunth. Enum. iii. 320.

Nile Land. British East Africa: Kukuyu district; in Kedung Valley, 6000 ft., *Scott-Elliot*, 6876! Mount Kenia, in the lower forest zone, 8100 ft., *Gregory*.

Cosmopolitan, concentrated in the North Temperate zone. Occurs also in Madagascar and South Africa.

2. **J. maritimus,** *Lam. Encycl.* iii. 264. Perennial, densely tufted on a short rhizome. Leaves few, basal, terete, resembling the stems, dilated at the base into pale brown sheaths. Stems terete, pale green, wiry, finely striated. 2–3 ft. long. Panicle very compound, lateral, sessile, reaching $\frac{1}{2}$ ft. long, bracts rigid, pale green, ovate-lanceolate. Perianth-segments lanceolate, acute, pale green, $\frac{1}{12}$ in. long. Stamens 6. Capsule oblong, acute, as long as the perianth. Seeds distinctly or indistinctly tailed.—Buchen. in Engl. Jahrb. xii. 256; Baker in Dyer, Fl. Cap. vii. 19. *J. Kraussii*, Hochst. in Flora, 1845, 342.

Upper Guinea. Senegambia, *Heudelot*, 511!

Nile Land. Somaliland; Maid, *Hildebrandt*, 1475!

Lower Guinea. Angola: Mossamedes; marshy places at Aguadas near Mossamedes and by ponds near the River Bero, *Welwitsch*, 3007!

Also in South Africa and the North Temperate zone of both hemispheres.

3. **J. punctorius,** *Linn. fil. Suppl.* 208. Perennial, tufted on a short creeping rhizome. Produced leaf one from the middle of the stem, terete, septate; basal leaves reduced to clasping sheaths. Stem stout, terete, hardly at all striated, 1–4 ft. long. Inflorescence an ample terminal panicle; flowers many in a cluster; bracts ovate-cuspidate, pale green, much shorter than the flowers. Perianth-segments lanceolate, acute, pale green, rigid, $\frac{1}{12}$ in. long. Stamens 6, rather shorter than the perianth. Capsule oblong, acute, brown, as long as the perianth. Seeds not tailed.—Buchen. in Abhand. Naturw. Ver. Bremen, iv. 424, t. 8; Engl. Jahrb. xii. 277; Engl. Hochgebirgsfl. Trop. Afr. 158; Schweinf. in Bull. Herb. Boiss. ii. App. ii. 59, 107; Baker in Dyer, Fl. Cap. vii. 20. *J. Schimperi*, Hochst. in Schimp. Pl. Abyss. No. 56; A. Rich. Tent. Fl. Abyss. ii. 338.

Nile Land. Eritrea: near Saganeiti, 7400 ft., *Schweinfurth & Riva*, 1747! 1802! Godofelassi, *Rohlfs & Stecher*. Abyssinia: Tigre; near Adowa, *Schimper*, 56! Magdala, *Steudner*, 927. Somaliland: Golis Range, *Miss Edith Cole! Mrs. E. Lort-Phillips!*

Also in South Africa, North Africa, and Western Asia.

4. **J. oxycarpus,** *E. Meyer ex Kunth, Enum.* iii. 336. Perennial, densely tufted. Produced leaves 3–5 to a stem, short, subulate, septate. Stems moderately stout, terete, 1–2 ft. long, pale green, hardly at all striated. Inflorescence a sparse terminal panicle; flowers about 20 in a cluster; bracts ovate-acuminate, as long as the flowers, Perianth-segments lanceolate, brownish-green, $\frac{1}{6}$ in. long. Stamens usually 3, much shorter than the perianth. Capsule oblong, dark brown, as long as the perianth. Seeds not tailed.—Buchen. in Abhand. Naturw. Ver. Bremen, iv. 431, t. 8; Engl. Jahrb. xii. 336; Pfl. Ost-Afr. C. 137; Baker in Dyer, Fl. Cap. vii. 20.

Nile Land. Usambara (ex *Engler*).

Lower Guinea. Angola: Huilla; plentiful in wet sandy situations throughout the district, *Welwitsch*, 3008!

Also in South Africa.

5. **J. Fontanesii,** *J. Gay ex Laharpe in Mém. Soc. Hist. Nat. Par.* iii. (1827), 130. Perennial, densely tufted. Leaves 3–5 to a stem, short, subulate, septate. Stems moderately stout, scarcely at all striated, erect or long and decumbent. Inflorescence a lax terminal panicle, composed of few or many globose heads; flowers many to a head; bracts ovate, acuminate, pale green, as long as the flowers. Perianth-segments lanceolate, very acute, brownish-green, $\frac{1}{6}$ in. long. Stamens 6. Capsule oblong, acute, dark brown, as long as or longer than the perianth. Seeds not tailed—Buchen. in Engl. Jahrb. xii. 328; Engl. Hochgebirgsfl. Trop. Afr. 158; Pfl. Ost-Afr. C. 137; Schweinf. in Bull. Herb. Boiss. ii. App. ii. 59, 107. *J. articulatus,* Desf. Fl. Atlant. i. 313. *J. quartinianus,* A. Rich. Tent. Fl. Abyss. ii. 339. *J. pyramidatus,* Laharpe in Mém. Soc. Hist. Nat. Par. ii. (1827), 128; Boiss. Fl. Orient. v. 359.

Nile Land. Eritrea: vicinity of Saganeiti, 7000 ft., *Schweinfurth & Riva,* 815! 892! Abyssinia: Begemeder; Anadehr, 7800 ft., *Schimper,* 555! Harre Shoa, 6500 ft., *Schimper,* 850; Shireh province, *Quartin-Dillon.* British East Africa: Karia Ndusi, near Lake Elmeteita, 6000 ft., *Scott-Elliot,* 6623! steppes between Ndoro and Guaso Thegu, *Gregory.*

Mozamb. Dist. German East Africa: Usambara; Leboma, *Holst,* 2556! British Central Africa: Nyasaland; Mount Zomba, 4000–6000 ft., *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!*

Also in the Mediterranean Region and Western Asia.

6. **J. Bachiti,** *Hochst. in Steud. Syn. Pl. Glum.* ii. 305. Perennial, densely tufted. Produced leaves 3–5 to a stem, short, narrowly linear, not septate. Stem slender, 1–1½ ft. long, leafless, finely striated. Inflorescence a sparse terminal panicle; flowers many in a globose cluster; bracts ovate, green, shorter than the flowers. Perianth-segments lanceolate, $\frac{1}{8}$ in. long, dark brown. Stamens 6, much shorter than the perianth. Capsule ovoid, dark brown, as long as the perianth. Seeds not tailed—Buchen. in Engl. Jahrb. xii. 437; Engl. Hochgebirgsfl. Trop. Afr. 158, and Pfl. Ost-Afr. C. 137.

Nile Land. Abyssinia: Samen; in swamps on Mount Bachit, 10,700 ft., *Schimper,* 114! Begemeder; Selamuko, 8700 ft., *Schimper,* 1332! Mount Guna, *Schimper,* 11,300 ft., 1557!

Mozamb. Dist. German East Africa: Usambara, *Holst* (ex *Engler*); Kilimanjaro; Marangu, 7700 ft., *Volkens,* 1309.

7. **J. lomatophyllus,** *Spreng, Neue Endeck.* ii. 108. Perennial, tufted, and stoloniferous. Leaves many in a basal tuft, linear, flat, ½–1 ft. long, ¼–½ in. broad, not septate. Stem moderately stout, leafless, deeply sulcate, 1–2 ft. long. Inflorescence terminal, laxly panicled; flowers 6–12 in a cluster; bracts ovate, cuspidate. Perianth-segments $\frac{1}{8}$ in. long; outer lanceolate, acute; inner oblong. Stamens 6, rather shorter than the perianth. Capsule oblong, brown, shorter than the perianth. Seeds not tailed.—Buchen. in Engl. Jahrb. xii. 429; Engl. Pfl. Ost-Afr. C. 137; Baker in Dyer, Fl. Cap. vii. 27.

Mozamb. Dist. German East Africa: Usambara (ex *Engler*).

Widely spread in South Africa.

8. **J. bufonius**, *Linn. Sp. Pl.* 328. Annual, densely tufted, without any creeping rootstock. Leaves all basal, subulate, not septate, the outer as long as the stem. Stem slender, 3–12 in. long. Flowers usually single, arranged in lax forked spikes; bracts minute. Perianth-segments pale green, lanceolate, acuminate, $\frac{1}{6}$ in. long. Stamens 3–6, much shorter than the perianth. Capsule oblong, brown, obtuse, minutely cuspidate, rather shorter than the perianth. Seeds not tailed.—A. Rich. Tent. Fl. Abyss. ii. 339; Buchen. in Engl. Jahrb. xii. 174; Engl. Hochgebirgsfl. Trop. Afr. 158; Baker in Dyer, Fl. Cap. vii. 23.

Nile Land. Abyssinia: Tigre; in marshes near Adowa, 10,000–11,000 ft., *Schimper*, 1088! Samen; near Debra Eski, 9700 ft., *Schimper*, 33; swamps on Mount Bachit, 11,700 ft., *Schimper*, 117; Shireh province, *Quartin-Dillon* (ex *Engler*).

Cosmopolitan.

9. **J. capitatus,** *Weig. Obs.* 28. Annual, tufted, without any rootstock. Leaves all basal, subulate, very slender, much shorter than the stem, not septate. Stem very slender, 2–6 in. long. Flowers usually 4–8 in a single globose terminal cluster, subtended by a subulate bract. Perianth-segments lanceolate, acuminate, brownish, $\frac{1}{6}$ in. long, recurved at the tip. Stamens 3, much shorter than the perianth. Capsule ovoid-trigonous, brown, much shorter than the perianth. Seeds not tailed.—Buchen. in Engl. Jahrb. xii. 450; Engl. Hochgebirgsfl. Trop. Afr. 158.

Upper Guinea. Cameroons: Cameroon Mountain, 7000 ft., *Mann*, 2094!

Nile Land. Abyssinia: Tigre; summit of Mount Semayata, near Adowa, 10,400 ft., *Schimper*, 539!

Also Central and Southern Europe and North Africa.

2. LUZULA, DC.; Benth. et Hook. f. Gen. Pl. iii. 868.

Perianth rigid, cut down to the base; segments ovate, subequal. Stamens 6, shorter than the perianth, hypogynous or attached to the base of the perianth-segments; filaments filiform; anthers linear or oblong, basifixed. Ovary sessile, 1-celled; ovules 3, arising from a short basal placenta; style short, subulate; stigmas 3, filiform. Seeds 3 or fewer, subglobose or angled on the inner side, sometimes tailed; testa minutely striated; albumen copious; embryo minute.—Densely tufted perennial herbs. Leaves linear, ciliated. Inflorescence terminal, laxly or densely panicled. Perianth brown in the Tropical African species.

Cosmopolitan, concentrated in the North Temperate zones. Species about 50.

- Flowers solitary, forming a lax panicle . . . 1. *L. Johnstoni.*
- Flowers many in a cluster.
  - Clusters of flowers usually peduncled . . . 2. *L. campestris.*
  - Clusters of flowers sessile.
    - Stamens much shorter than the perianth . . 3. *L. spicata.*
    - Stamens slightly shorter than the perianth . 4. *L. Volkensii.*

1. **L. Johnstoni,** *Buchen. in Engl. Jahrb.* xii. 79. Nearly allied to *L. Forsteri*, DC. Stoloniferous. Leaves many in a basal rosette, linear, 3–4 in. long, slightly hairy. Stem very slender, erect, a foot or more long, bearing 2–3 remote reduced leaves. Panicle small, lax, terminal; branch-bracts subulate; branches very slender, ascending; flowers solitary, sessile; flower-bracts ovate, acuminate, bright brown, shorter than the perianth. Perianth-segments lanceolate, acute, bright brown, $\frac{1}{8}$ in. long. Stamens 6, much shorter than the perianth. Capsule subglobose, stramineous, much shorter than the perianth.—Engl. Hochgebirgsfl. Trop. Afr. 157; Pfl. Ost-Afr. C. 137.

Mozamb. Dist. German East Africa: Kilimanjaro, 8000–9000 ft., *Johnston*, 28!

2. **L. campestris,** *DC.*, var. **Mannii,** *Buchen. in Engl. Jahrb.* xii. 159. Leaves many in a basal rosette, linear, 4–12 in. long, $\frac{1}{4}$ in. broad, densely ciliated towards the base. Stem $\frac{1}{2}$–1 ft. long, erect, bearing 1–2 reduced leaves. Panicle subumbellate, composed of several peduncled clusters or congested by the suppression of the peduncles; branch-bracts linear-subulate, 1–3 in. long, densely ciliate towards the base; flower-bracts ovate, acuminate, scariose, pale green, as long as or shorter than the flowers. Perianth-segments lanceolate, acuminate, dark brown, $\frac{1}{8}$ in. long. Stamens 6, rather shorter than the perianth. Capsule ovoid-trigonous, rather shorter than the perianth. — Engl. Hochgebirgsfl. Trop. Afr. 157.

Upper Guinea. Cameroons: Cameroon Mountain, 10,000–13,500 ft., *Mann*, 2108! *Johnston!* Fernando Po: summit of Clarence Peak, 8000 ft., *Mann*, 658! 1467!

Nearly allied to the European *L. multiflora*, Lej.

The species is almost cosmopolitan, concentrated in the North Temperate zone.

3. **L. spicata**, *DC.*, var. **simensis,** *Hochst. in Schimp. Pl. Abyss. Exsicc.* 1154. Shortly stoloniferous. Basal leaves several, linear, 3–4 in. long, glabrous when mature. Stem slender, $\frac{1}{2}$–1 ft. long, erect, bearing 2–3 erect reduced leaves. Inflorescence a small, oblong, erect, congested panicle; lower branch-bracts linear, densely ciliate at the base; flower-bracts ovate, acuminate, brown with stramineous tip and edges, shorter than the perianth. Perianth-segments dark brown, ovate-lanceolate, acute, $\frac{1}{12}$ in. long. Stamens 6, much shorter than the perianth. Capsule ovoid-trigonous, about as long as the perianth.—Buchen. in Engl. Jahrb. xii. 128; Engl. Hochgebirgsfl. Trop. Afr. 157; Pfl. Ost-Afr. C. 137. *L. abyssinica*, Parl. Fl. Ital. ii. 310. *L. macrotricha*, Steud. Syn. Fl. Glum. ii. 294.

Nile Land. Abyssinia: Samen; Demerki Mountains, *Schimper*, 1154; Begemeder; Mount Guna, 11,700 ft., *Schimper*, 1328. British East Africa: Mount Kenia, in the Bamboo zone, 5000–6000 ft., *Gregory*.

The type occurs on the mountains of the North Temperate zone in both hemispheres.

4. **L. Volkensii,** *Buchen. in Engl. Jahrb.* xxi. 192. Leaves 6–8 to a stem, erect, linear, 3–4 in. long, $\frac{1}{6}$ in. broad, thick, firm, ciliate with

long deciduous hairs. Stem short, terete. Inflorescence a dense terminal panicle; flowers many in sessile clusters; lower branches subtended by reduced leaves; flower-bracts small, ovate, acuminate, pale, ciliate. Perianth-segments lanceolate, dark brown, $\frac{1}{12}$ in. long. Stamens 6, rather shorter than the perianth. Capsule ovoid-trigonous, dark brown, shorter than the perianth.—Engl. Pfl. Ost-Afr. C. 137.

Mozamb. Dist. German East Africa: Kilimanjaro; Mawenzi Peak, 12,300 ft., *Volkens*, 1365!

Order CXLVII. **PALMÆ.** (By C. H. Wright.)

Flowers usually small, regular or subregular, hermaphrodite or unisexual. Sepals 3, distinct or united, in the male flower open or imbricate in æstivation, in the female usually widely imbricate. Petals 3, distinct or united, valvate or imbricate in æstivation. Stamens 6 to many (rarely 3), inserted at the base of the petals or in the corolla-tube; anthers elongate, sometimes sagittate, basi- or dorsi-fixed, dehiscing longitudinally; filaments free or connate, subulate or filiform; staminodes various. Ovary superior, more or less globose, entire or 3-lobed, or of 3 distinct carpels, 3- or more celled, often represented by a rudiment in the male flowers; style very short or none; stigmas 3, erect or recurved; ovules solitary, erect, pendulous or attached to the inner angle of the cell. Fruit seated on the more or less enlarged calyx and corolla, dry, baccate or drupaceous, bearing at its apex, side or base the remains of the stigma, 1- or more celled, rarely of 3 distinct carpels, in Tribe *Lepidocaryeæ* covered with retrorsely imbricate scales; mesocarp often containing fibres; endocarp membranous, crustaceous, woody or stony, smooth or marked inside with the branches of the raphe. Seeds of the same shape as the cell, free or adherent to the endocarp; hilum basal or lateral; raphe short or long, usually branched and the branches often much reticulated; albumen horny or cartilaginous, more rarely oily, solid or hollow, homogeneous or ruminate; embryo small, conical or cylindrical, usually near the hilum on the dorsal side, more rarely lateral or apical.—Solitary or gregarious plants, monocarpic or polycarpic. Stems robust or slender, simple, more rarely branched (in *Hyphæne*), erect or climbing, smooth or spiny, ringed or bearing the scars or remains of old leaves. Leaves collected in a crown near the apex of the stem or scattered along it, usually very large, at first entire, then splitting pinnately or flabellately into more or less distinct leaflets, induplicate or reduplicate in vernation; rhachis in the pinnate leaves convex on the back, keeled above, channelled along the sides where the leaflets are inserted; petiole subcylindrical or more or less channelled on the upper side, in flabellate leaves produced into a ligule at the apex, more or less sheathing at the base; margins of sheath often breaking up into fibres. Inflorescence (*spadix*) on a long peduncle from amongst the leaves or on a short one below them, monœcious, dicecious or polygamous, branched or simple; spathes various in number and shape; bracts and bracteoles distinct or connate into a cup, or cylindrical or wanting.

Genera about 140; species about 1200, dispersed throughout the tropics and extending a short distance outside.

TRIBE I. **Areceæ.**—*Leaves pinnatisect; segments distinct or confluent into an entire, bifid or laciniate lamina, reduplicate in vernation. Flowers monœcious or diœcious. Seeds umbilicate; raphe ventral; embryo dorsal.*

Ovule erect. Albumen ruminate . . . . . 1. ARECA.
Ovule pendulous. Albumen homogeneous.
Stamens 6 . . . . . 2. PODOCOCCUS.
Stamens many . . . . . 3. SCLEROSPERMA.

TRIBE II. **Phœniceæ.**—*Leaves pinnatisect; segments acuminate, induplicate in vernation. Spadices interfoliaceous, diœcious; spathe* 1. *Carpels* 3, *one only ripening; stigma terminal. Seed deeply grooved ventrally, umbilicate; embryo dorsal.*

The only genus . . . . . 4. PHŒNIX.

TRIBE III. **Lepidocaryeæ.**—*Leaves pinnatisect* (*in the Tropical African genera*); *segments reduplicate in vernation. Spadices terminal or axillary; spathes many or none. Flowers hermaphrodite or unisexual. Ovary entire, more or less perfectly* 3*-celled. Fruit clothed with shining retrorsely imbricate scales. Seeds umbilicate; raphe dorsal; embryo ventral.*

Stems erect . . . . . 5. RAPHIA.
Stems climbing.
Polycarpic.
Spathes present.
Ovary imperfectly 3-celled . . . . 6. CALAMUS.
Ovary perfectly 3-celled . . . . 7. ONCOCALAMUS.
Spathes none . . . . . 8. EREMOSPATHA.
Monocarpic . . . . . 9. ANCISTROPHYLLUM.

TRIBE IV. **Borasseæ.**—*Leaves fan-shaped; segments reduplicate in vernation. Spadices interfoliaceous, diœcious; spathes many, sheathing. Ovary entire,* 3*-celled; ovules ascending. Seed with a diffuse hilum.*

Albumen homogeneous.
Male flowers many in pits on the spadix . . 10. BORASSUS.
Male flowers solitary in pits on the spadix . . 11. HYPHÆNE.
Albumen ruminate . . . . . 12. MEDEMIA.

TRIBE V. **Cocoineæ.**—*Leaves pinnatisect; segments reduplicate in vernation Spadices interfoliaceous; spathes* 2 *or many. Flowers* (*at least on the lower part of the spadix*) *in threes, the central female, the lateral male. Ovary* 1–7*-celled. Fruit* 1–7*-celled; stigmas terminal; endocarp with* 3–7 *pores. Seed adhering to the endocarp; hilum diffuse; embryo opposite a pore of the endocarp.*

Male flowers sunk in pits on the spadix. Pericarp spongy . . . . . 13. ELÆIS.
Male flowers superficial. Pericarp thick, fibrous . 14. COCOS.

1. **ARECA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 883.

Male flowers minute, solitary or geminate on the spadix-branches. Sepals 3. Petals 3, much longer than the sepals, broadly ovate. Stamens 3 or 6. Female flowers much larger than the male, solitary towards the base of the spadix-branches. Sepals and petals usually

enlarging after flowering. Ovary entire, 3-celled; ovule erect, basal. Albumen ruminate.—Unarmed palms. Stems solitary or cæspitose, annulate. Leaves in a terminal crown, equally pinnatisect. Spadix infrafoliaceous; branches patent, pendulous in fruit; spathes 3 to many, caducous.

Species about 24, distributed through Tropical Asia, New Guinea, and Tropical Australia.

1. **A. Catechu,** *Linn. Sp. Pl. ed.* i. 1189. Stem cylindrical, unbranched, 40–50 ft. high, 20 in. in diam., annulate. Leaves 6–9; petiole thick, concave above, convex beneath, sheathing and coriaceous at the base; leaflets many, opposite, broadly linear, acuminate, broad at the base, the lower 3–4 ft. long. Spadix 2–3 ft. long, much branched, male above, female below; spathes 2, boat-shaped, obtuse, striate, coriaceous; bracts 0. Male flowers sessile. Sepals 3, ovate, acute, Petals 3, much longer than the sepals, broadly ovate, acute, yellowish. Stamens 6; filaments short, more or less united into a column below; anthers dorsifixed. Female flowers sessile. Sepals 3, broadly ovate, fleshy, very thick in the centre, thin at the margins, concave, persistent. Staminodes none or forming a hypogynous 6-toothed ring. Ovary large, ovoid, acute, smooth, 3-celled; ovules solitary; stigmas 3, triangular, acute, papillose. Fruit ovoid, tapering upwards, 2–2½ in. long, smooth, orange when mature, 1-celled; pericarp at first soft, afterwards containing many distinct longitudinal fibres. Seed conic-globose, solitary, erect, 1 in. in diam.; testa very thin; endosperm very hard, white or pinkish; embryo small, basal.—Mart. Palm. 169, tt. 102, 149, fig. 4; Blume, Rumphia, ii. t. 102, fig. A; Bentl. & Trim. Med. Pl. t. 276; Engl. Pfl. Ost-Afr. B. 15, C. 131; Hook. f. Fl. Brit. Ind. vi. 405.

Mozamb. Dist. Zanzibar and coast of German East Africa, cultivated, ex *Engler.*

Also in India, South China, and Malaya.

2. PODOCOCCUS, Mann et Wendl.; Benth. et Hook. f. Gen. Pl. iii. 915.

Male flower: Sepals 3. Corolla stalked, 3-lobed. Stamens 6; filaments subulate, adnate at the base to the corolla-tube and to the rudiment of the ovary; anthers oblong, cordate at the base, dorsifixed. Female flower: Sepals 3. Corolla stalked, trifid. Staminodes 6, very small. Ovary 3-celled; stigmas 3, recurved; ovule pendulous. Fruit baccate 1- (rarely 2–3-) seeded, with the stigmatic scar near its base. Seed surrounded by the branches of the raphe, which radiate from the hilum and anastomose towards their extremities; albumen homogeneous; embryo dorsal, at or below the middle of the albumen.—Slender unarmed palm. Stems reed-like, annulate. Leaves alternate, pinnate; leaflets membranous. Spadix simple, on a long peduncle; spathes 4, tubular, marcescent; bracts short; bracteoles minute, glumaceous.

Endemic, monotypic.

1. **P. Barteri,** *Mann & Wendl. in Trans. Linn. Soc.* xxiv. 426, *t.* 38, *fig.* A, *t.* 40, *fig.* B, *and t.* 43, *fig.* A. An erect, unbranched palm, covered with rusty scurf on all its parts. Stem 5–8 ft. high, 9 lin. in diam., annulate, with innovations arising from the base; internodes 3–5 in. apart. Leaves 6–9, 5–6 ft. long, pinnatisect, glaucous green; sheath about a foot long, striate, splitting obliquely, lacerate at the margins; petiole 1–1½ ft. long, subterete, channelled on the upper side towards the base; rhachis convex on the back, acute above; leaflets 8–10 on each side, alternate, elliptic-oblong, 3–4 in. apart, plicate, many-nerved, the longest 1 ft. by 4 in., the lower smaller, the two terminal confluent, lower margins entire, upper irregularly eroso-dentate. Spadix lateral, patent, at length pendulous, about 2½ ft. long; peduncle subterete, about as long as the rhachis; rhachis 3 lin. thick; spathes 4 on the lower part of the peduncle, tubular, marcescent, the two lower incomplete and 4–5 in. long, the upper more complete, oblique, splitting irregularly and 8–12 in. long. Flowers produced from June to August in 8–10 straight or spiral rows of pits, ternate, the central female, the lateral male, reddish. Male flower: Sepals 3, distinct, elliptic-oblong, often trifid at the apex, keeled, subfalcate, scarcely 1 lin. long, contorted in bud. Corolla 2 lin. long; lobes elliptic-oblong, concave, cartilaginous, striate on the back, patent, valvate. Stamens 6, alternately long and short; filaments filiform, adnate at the base to the corolla-tube and rudimentary 3-toothed ovary; anthers oblong-cordate, dorsifixed. Female flower: Sepals as in the male, but less rigid. Corolla 3-fid, united with the base of the ovary into a short stalk; lobes oblong, acute, concave, striate on the back, erecto-patent. Staminodes 6, minute. Ovary 3- (or by abortion 1-) celled, stipitate, oblong; stigmas 3, terminal, short, recurved; ovule pendulous. Fruit baccate, edible, oblong or elongate-oblong, orange, bent above the base, with the scar of the stigma subbasal, stipitate, nearly 1 in. by 4–5 lin. Seed elongate-ellipsoid, slightly oblique, 9 lin. by 2 lin.—J. Braun & K. Schum, in Mitth. Deutsch. Schutzgeb. ii. (1889) 148; Drude in Engl. Jahrb. xxi. 112.

Upper Guinea. Niger Delta: mouth of the Brass River, *Barter,* 36 ! 325 ! 1837 ! Left bank of the River Nun, *Mann,* 452 !

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux,* 94 ! 95.

3. SCLEROSPERMA, Mann et Wendl.; Benth. et Hook. f. Gen. Pl. iii. 919.

Male flower: Sepals 3. Corolla-lobes 3, valvate. Stamens many; filaments very short; anthers linear, extrorse, basifixed. Female flower: Calyx of 3 distinct sepals or 3-lobed. Corolla 3-lobed; lobes convolute below, valvate at the apex. Staminodes 6 or 9, very small. Ovary unicarpellary, 1-celled; ovule pendulous; stigma large, oblique. Fruit a large drupe, obliquely depressed, stigmatic scar lateral; epicarp thin; mesocarp fibrous; endocarp thin but hard. Seed depressed globose, surrounded by the branches of the raphe, which radiate from

the linear hilum and form a loose network towards their extremities; albumen copious, very hard, homogeneous; embryo dorsal near the apex, almost opposite the hilum.—Slender, gregarious, unarmed palms. Stems very short, densely fastigiate. Leaves fascicled, erecto-patent, imparipinnate; leaflets subopposite. Spadix short, simple, bearing at the base two male flowers at the side of each female, in the upper part male flowers only; spathes 2, persistent; bracts membranous.

Endemic, monotypic.

1. **S. Mannii,** *Wendl. in Trans. Linn. Soc.* xxiv. 427, *t.* 38, *fig. C, and t.* 40, *fig. A.* Slender cæspitose palms. Stem very short. Leaves 10–13 ft. long, rigid, sparingly clothed with rusty evanescent scurf; sheath 1–1½ ft. long, breaking up at the margin into reticulate fibres; petiole 7–8 ft. long, subterete; blade elliptic–oblong, 4–5 ft. by 2 ft.; rhachis acute above, convex beneath; leaflets 9–12 on each side, obliquely truncate, slightly contracted at the base, light green, smooth and shining above, whitish and covered with deciduous rusty scales beneath, crenate and minutely toothed at the apex, 1½–2 ft. by 2–3 in., 3–5-nerved; terminal leaflets unequal, confluent below, 12–17-nerved. Primary spadix about 8 in. long, the lateral erect, concealed amongst the leaf-bases; peduncle 4 in. long, 9 lin. thick, brownish tomentose. Spathes 2, persistent, fuscous; outer 5–6 in. long, irregularly laciniate at the apex; inner about 8 in. long, ellipsoid, breaking up at the apex into reticulate fibres. Flowers spirally arranged, in the lower part one female between two male, in the upper part male only densely crowded; bracts broadly ovate, acute, concave; male bracteoles small or obsolete, female broadly ovate, acute. Male flower: Sepals oblong-lanceolate, concave, keeled, membranous, 1½–2 lin. long, those of the apical flowers one-half the size, linear-spathulate, obtuse, incurved, membranous below. Corolla-lobes elliptic-oval, rigid, thick, 3–4 lin. long, those of the upper flowers broadly obovate, mucronate, incurved, 5 lin. long, reddish. Filaments very short, hemispherical; anthers linear; connective percurrent. Female flowers: Sepals free or shortly united, broadly ovate, acute, incrassate, concave, slightly keeled, margin with deciduous scales. Petals ovate, abruptly acuminate, concave, marcescent, as long as or slightly longer than the sepals. Staminodes 6 or 9, minute, lanceolate. Ovary ellipsoid, shorter than the petals; stigma large, suberect; ovule basal. Drupe 1¼ in. diam., subglobose, obliquely depressed, bearing the stigmatic scar near the apex; epicarp brown, thin, rather shiny; mesocarp of very thin fibres; endocarp thin, stony. Seed 1 in. by 9 lin.; hilum slightly excentric, with radiating anastomosing fibres; albumen copious, very hard; embryo near the apex.—Drude in Engl. Jahrb. xxi. 112.

Lower Guinea. Gaboon: in swampy places near the River Gaboon, from Point Clara upwards, *Mann,* 1046! *Soyaux* (ex *Drude*).

4. **PHŒNIX**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 921.

Male flower oblong or lanceolate. Calyx cupular, 3-toothed. Petals 3, slightly connate at the base, valvate. Stamens 6; filaments connate at the base; anthers linear-oblong, dorsifixed. Rudiment of ovary small or none. Female flower globose. Calyx as in the male. Petals 3, rotundate, concave, broadly imbricate. Staminodes 6, connate. Carpels 3, distinct; stigma sessile; ovule erect. Fruit drupaceous; stigmatic scar terminal. Seed deeply grooved on the ventral side; albumen cartilaginous; embryo minute, dorsal. — Unarmed trees. Stems cylindrical. Leaves pinnate; leaflets lanceolate, induplicate. Spadix interfoliaceous, branched. Spathe solitary. Flowers small, yellow, diœcious.

Species about 12, dispersed through Tropical and Subtropical Asia and Africa.

Fruit fleshy	1. *P. dactylifera.*
Fruit dry.	
Endocarp hard. Seed slightly pointed above, 7 by 4 lin.	2. *P. abyssinica.*
Endocarp thin. Seed rounded above, 5–7 by $2\frac{1}{2}$–3 lin.	3. *P. reclinata.*

1. **P. dactylifera,** *Linn. Sp. Pl. ed.* i. 1188. Stem tall, straight, cylindrical, soboliferous at the base, scaly in the younger parts with the remains of leaf-bases. Leaves 10 ft. or more long, glaucous; leaflets lanceolate-linear, acuminate, somewhat 4-ranked, the anticous often distichous, irregularly and remotely aggregate, the central longest. Female flower globose. Corolla twice as long as the calyx. Drupe long, elliptic, variously coloured, usually more than 1 in. long; pericarp thick, fleshy, saccharine.—Gærtn. Fruct. i. 23, t. 9, fig. 2; Forsk. Fl. Ægypt.-Arab. cxxvi.; Lam. Encycl. ii. 261, and Ill. t. 893, fig. 1; Hook. Journ. Bot. 1834, 212; Delile, Fl. Égypte, 169, t. 62; Mart. in Münch. gel. Anzeig. 1838, 638, and 1839, 38, and Palm. iii. 257, t. 120, t. X, fig. 1, t. Z, i. fig. A; Kunth, Enum. iii. 255; Kirk in Journ. Linn. Soc. ix. 233; Becc. Malesia, iii. 355, t. 43, figs. 1–14; Engl. Pfl. Ost-Afr. B. 12, C. 130; Drude in Engl. Jahrb. xxi. 110.

Upper Guinea. Senegambia: Fort St. Louis, *Brunner* (ex *Martius*). Isle of Goree; Porto Prana, *Brunner* (ex *Martius*).

Nile Land. British Somaliland: Waggar Mountains, *Mrs. Lort-Phillips*

Lower Guinea. Congo and Benguela (ex *Martius*).

Mozamb. Dist. Portuguese East Africa: "On the Zambesi there is one solitary tree outside the stockade of Sena," *Kirk*. German East Africa: Kilimanjaro, up to nearly 6000 ft., *Johnston*, 197! British Central Africa: Nyasaland on the Upper Shire at Matope, *Scott-Elliot*, 8494!

Owing to this species having been cultivated throughout Tropical Africa from remote times, it is difficult to decide where it is truly indigenous.

2. **P. abyssinica,** *Drude in Engl. Jahrb.* xxi. 110, 119. Habit of *P. dactylifera*, Linn. Lower leaflets reduced to spines; upper lanceolate, more or less aggregate, 10 in. by $\frac{1}{2}$ in. Calyx of male

flower half as long as the corolla, urceolate. Fruit dry, seated on the marcescent cup-shaped calyx and corolla; endocarp hard. Seed very slightly pointed above, 7 lin. long, 4 lin. broad.—*P. dactylifera ?* Engl. Hochgebirgsfl. Trop. Afr. 153.

Nile Land. Eritrea: Valley of Ainsaba, near Keren, *Steudner*, 1540! between Keren and Adowa, *Steudner*, 1511; Hamasen district, *Steudner*, 1541. Abyssinia: Adowa, *Schimper*, 794! *Steudner*, 1539.

3. **P. reclinata,** *Jacq. Fragm.* i. 27, *t.* 24. Stem erect, 3–4 ft. high. Leaves 3–5 ft. long, bright green; petiole flat above, slightly convex beneath, expanded at the base into a fuscous fibrous sheath; leaflets rigid, lanceolate, acuminate, pungent, the central 1 ft. by 1 in., the lowest subspinescent and aggregate, the remainder equidistant, midrib with white floccose indumentum on the lower side. Male flower lanceolate, acuminate. Female spadix 2 ft. long; branches 6–8 in. long; peduncle over 1 ft. long, complanate, glabrous. Petals fuscous. Drupe cylindric-elliptic, 7–8 lin. long, 4–5 lin. wide at the middle, dull red. Seed ovate, 5 lin. long, deeply sulcate; embryo a little below the middle.—Willd. Sp. Pl. iv. 731; Mart. in Münch. gel. Anzeig. 1838, 638, and Palm. iii. 272, t. 164; Kunth, Enum. iii. 256; Becc. Malesia, iii. 349; Engl. Pfl. Ost-Afr. B. 13, C. 130; C. H. Wright in Dyer, Fl. Cap. vii. 29; Schweinf. in Bull. Herb. Boiss. iv. App. iii. 33; Rendle in Cat. Afr. Pl. Welw. ii. 82; Penzig in Atti Congr. Bot. Genova, 1892, 363. *P. spinosa*, Schum. & Thonn. Beskr. Guin. Pl. 437; Mart. in Münch. gel. Anzeig. 1838, 638, and 1839, 45; Kunth, Enum. iii. 256; Kirk in Journ. Linn. Soc. ix. 234; Benth. in Hook. Niger Fl. 526; Mann & Wendl. in Trans. Linn. Soc. xxiv. 428; J. Braun & K. Schum. in Mitth. Deutsch. Schutzgeb. ii. (1889) 148; Durand & Schinz, Études Fl. Congo, i. 272; Schweinf. in Bull. Herb. Boiss. ii. App. ii. 51. *P. leonensis*, Lodd. ex Kunth, Enum. iii. 256. *P. senegalensis*, Van Houtte ex Salomon in Gartenflora, 1884, 305.

Upper Guinea. Senegal, *Perrottet*, 760! South Senegambia, *Brunner!* Sierra Leone, *Oldfield!* Gold Coast: Aburi Hills, *Johnson*, 459! Niger Delta: banks of the River Nun, *Mann*, 528!

Nile Land. Eritrea: Aidereso, 4000 ft., *Schweinfurth & Riva*, 1610! Arrot Valley, Barario, 4400 ft., *Schweinfurth & Riva*, 740! Geleb, 4592 ft., *Schweinfurth!* near Keren, 6232 ft., *Schweinfurth! Steudner*, 1540! *Penzig.* British East Africa: Pemba Island, *Stuhlmann*, 1128 (ex *Drude*); Jur; Genana, near Jur Ghattas, *Schweinfurth*, 1358! Uganda; Kampala, *Scott-Elliot*, 7352! *Stuhlmann*, 1300 (ex *Drude*); Mombasa, *Wakefield!*

Lower Guinea. Estuary of the Congo, as far as the Isle of Mateba, *Dupont, Roger.* Congo: Masongolo, *Burton! Smith!* Angola: Pungo Andongo; plentiful on the marshy banks of the Rivers Cuanza, Lombe, &c., and at Sansamanda and Mopopo, *Welwitsch*, 6667! Icolo e Bengo; between Tartambonda and Quicanda, *Welwitsch*, 6658! Barra do Dande; plentiful on the banks of the lake and of the River Dande, near Bombo, *Welwitsch*, 6659! 6659B! Calumquembo district, *Welwitsch*, 6672!

South Central. Congo Free State: Lunda; at Muscli Brook, *Buchner*, 689 (ex *Drude*).

Mozamb. Dist. German East Africa: Ugalla River, *Böhm*, 42A (ex *Drude*); Usambara; coast region, *Holst*, 2847, mountains to 6200 ft., *Holst*, and Pangani River, 2600 ft., *Volkens*, 462 (ex *Drude*). British Central Africa: Nyasaland; Fort Hill and Songue, *Whyte!* Central regions of the continent and on the coast, ex *Kirk*.

Also in South Africa.

5. **RAPHIA**, P. Beauv.; Benth. et Hook. f. Gen. Pl. iii. 935.

Male flower: Calyx tubular, entire or minutely toothed. Corolla curved; petals 3, linear-lanceolate, valvate. Stamens 6–16, inserted at the base of the petals; filaments subulate or thickened and connate at the base; anthers erect, linear, inserted near their bases. Rudiment of ovary none. Female flower larger than the male. Calyx as in the male. Corolla more or less campanulate, 3-toothed. Staminodes in a 6- to many-toothed cup adnate to the corolla. Ovary 3-celled, retrorsely scaly; stigmas sessile, recurved, subulate; ovule inserted slightly above the base of the cells. Fruit large, oblong or ellipsoid, rostrate, 1-seeded, covered with retrorsely imbricate scales; pericarp thick; endocarp spongy; seed laterally fixed, oblong, sulcate; hilum lateral; raphe linear with reticulate branches; albumen bony, solid, ruminate; embryo ventral.—Monocarpic palms, unarmed or with the sheaths only armed. Stems erect, simple or dichotomously branched, densely annulate. Leaves in a terminal crown, equally pinnatisect; leaflets linear-lanceolate, acuminate, margins recurved at the base and setose or aculeolate, rhachis not produced at the apex. Spadices monœcious, large, pendulous, cylindrical, much-branched; branches and branchlets thick, compressed, the latter pectinately arranged, densely covered with cup-shaped bracts; common spathe none. Flowers solitary in each bract, the male at the base of the ultimate branches of the spadix, the female at the apex.

Species about 12 in Tropical Africa and the Mascarene Islands, and 1 in Tropical America.

Fruit more or less turbinate.	
Fruit-scales rounded at the apex	1. *R. Ruffia.*
Fruit-scales acuminate	2. *R. textilis.*
Fruit cylindrical or ellipsoid.	
Stamens 6. Scales of fruit in 12 rows	3. *R. Monbuttorum.*
Stamens 8. Fruit oval-ellipsoid, with 8–10 rows of scales	4. *R. Gærtneri.*
Stamens 10. Fruit cylindric-ellipsoid, with 8–9 rows of scales	5. *R. vinifera.*
Stamens 15. Fruit long oval, with 12 rows of scales	6. *R. longiflora.*
Stamens 16. Fruit oval-ellipsoid, with 12–15 rows of scales	7. *R. Hookeri.*

1. **R. Ruffia,** *Mart. Palm.* iii. 217. Stem 6–26 ft. high, 1 ft. thick. Leaves up to 65 ft. long; petiole up to 13 ft. long, 10 lin. thick. Calyx of male flowers pedicelled. Fruit obovate or pyriform, somewhat depressed and mucronate at the apex; scales in 12–15 rows, very convex,

polished, chestnut-brown, adpressedly ciliate.—Kunth, Enum. iii. 217; Engl. Pfl. Ost-Afr. B. 16, C. 131. *Raphia pedunculata*, P. Beauv. in Desv. Journ. Bot. ii. 87, and Fl. Owar. i. 78, t. 44, fig. 2, t. 46, fig. 2. *Sagus farinifera*, Gærtn. Fruct. ii. 186, t. 120, fig. 3. *Sagus Ruffia*, Jacq. Fragm. 7, no. 27, t. 4, fig. 2. *Sagus pedunculata*, Lam. Encycl. Suppl. v. 13, and Ill. iii. 357, t. 771, fig. 2 a-g. *Metroxylon Ruffia*, Spreng. Syst. ii. 139.

Nile Land. British East Africa: Taveta, near Kilimanjaro, ex *Engler*.

Mozamb. Dist. Pemba Island and Zanzibar, ex *Engler*. German East Africa: on the coast, and Usagara and Usambara regions, ex *Engler*; Kilimanjaro region; Lake Yipe and Kahe, ex *Engler*.

Also in Madagascar.

2. **R. textilis,** *Welw. Apont.* 584. Fruit oval-turbinate, $2\frac{3}{4}$ in. long, nearly 2 in. thick; scales in 11–14 rows, 11 lin. long, 11–12 lin. wide, rather convex at the base, flatter towards the apex and with a broad shallow furrow, dark chestnut, acute at the base, darker and slightly fimbriate at the margin. Seed oval-turbinate, $2\frac{1}{4}$ in. long, 16 lin. thick; albumen slightly ruminate.—Syn. Explic. 39; Rendle in Cat. Afr. Pl. Welw. ii. 83. *R. Welwitschii*, Wendl. in Trans. Linn. Soc. xxiv. 439, t. 42, fig. B; Drude in Engl. Jahrb. xxi. 111.

Lower Guinea. Angola: Golungo Alto; near rivulets at 1800–2000 ft., and 120 miles from the coast, *Welwitsch*, 6666! 6671! and fruit 1054! Barro do Dande; gregarious on the River Dande, *Welwitsch*, 6663!

3. **R. Monbuttorum,** *Drude in Engl. Jahrb.* xxi. 111, 130. Acaulescent or with a stem up to 5 ft. long. Leaflets irregularly arranged, up to $1\frac{1}{4}$ in. wide. Male flower: Calyx shortly campanulate, $\frac{1}{4}$–$\frac{1}{3}$ as long as the corolla. Corolla-lobes curved, narrowly lanceolate from a linear base, long acuminate, 9–10 lin. long. Stamens 6, adnate to the base of the corolla-lobes; anthers narrowly linear from a sagittate base, shorter than the filaments; connective shorter at the back than the anther-cells. Female flower scarcely half as long as the male, obtuse and broad. Calyx enclosing, and its teeth overtopping, the short corolla. Staminodes absent. Young fruit long-pointed from an oval base, mature unknown; scales in about 12 rows.—Engl. Pfl. Ost-Afr. C. 131.

Nile Land. British East Africa: Jur; Okel (Okale), *Schweinfurth*, 1738! Lakes Albert Edward and Albert Nyanza, ex *Engler*.

South Central. Congo Free State: Monbuttu; in the water of the valleys near Munza, *Schweinfurth*, 3357!

Mozamb. Dist. Tanganyika, ex *Engler*.

4. **R. Gærtneri,** *Mann & Wendl. in Trans. Linn. Soc.* xxiv. 437, *t.* 42, *fig. D.* Spadix laxly branched; branches slender, the lower 5–7 in. long, 4 lin. thick. Male flowers 6 lin. long. Petals elliptical. Stamens 8; filaments clavate. Female flower: Petals 6 lin. long. Staminodes about 8. Fruit elongate- or oval-ellipsoid, $2\frac{1}{2}$–3 in. long, $1\frac{1}{4}$ in. thick, obliquely mucronate; scales in 8–10 rows, slightly emarginate at the base, 8 lin. long, 8 lin. broad, light chestnut, slightly

fimbriate at the margin. Seed elongate-ellipsoid, acute at either side, 2–2¼ in. by 9–11 lin.; albumen with narrow ruminations.—Drude in Engl. Jahrb. xxi. 111. *R. vinifera*, Drude in Engl. Jahrb. xxi. 111, not Beauv. *Sagus Palma-pinus*, Gærtn. Fruct. i. 27, t. 10, fig. 1.

Upper Guinea. Sierra Leone: Berria (Beria), *Scott-Elliot*, 5002! Fernando Po; from the shore to an altitude of 500 ft., *Mann!* Gold Coast, *Cameron!*

5. **R. vinifera,** *P. Beauv. Fl. Owar.* i. 77, *t.* 44, *fig.* 1, *t.* 45, *t.* 46, *fig.* 2. Stems of medium height. Leaves 6–7 ft. long; leaflets spiny. Spadix about 8 ft. long, laxly branched; lower branches 3–3½ ft. long, upper 1 ft. long; lower branchlets 8–10 in. long. Stamens 10–12. Female flowers usually in the upper part of the spadix. Staminodes about 20. Fruit cylindric-ellipsoid, shortly mucronate, 3 in. long, 1½–1¾ in. thick; scales in 8–9 rows, very broad, slightly emarginate at the base, rather convex above the base, with a deep groove within the apex, flattened at the margin, 9–10 lin. long, 9 lin. wide, greenish, margin slightly fimbriate and brownish. Seed 2¼ in. long, 1 in. thick; albumen with narrow ruminations.—Mart. Palm. iii. 216, and in Münch. gel. Anzeig. 1838, 639; Hook. Niger Fl. 526; Kirk in Journ. Linn. Soc. ix. 234; Mann & Wendl. in Trans. Linn. Soc. xxiv. 437, t. 42, fig. C; J. Braun & K. Schum. in Mitth. Deutsch. Schutzgeb. ii. (1889) 148; Kew Bulletin, 1891, 1; Drude in Engl. Jahrb. xxi. 111; Durand & Schinz, Études Fl. Congo, i. 273; Rendle in Cat. Afr. Pl. Welw. ii. 82. *Metroxylon viniferum*, Spreng. Syst. ii. 139.—*Palma conifera ex Guinea*, C. Bauh. Pinax, 510. *Palma vinifera Theveti*, C. Bauh. Hist. i. 369.

Upper Guinea. Sierra Leone, *Afzelius! Winterbottom* (ex *Martius*). Niger Territory: Oware and Benin; abundant by the sides of rivers, ex *P. Beauvois;* banks of the Old Calabar River, *Mann!*

Lower Guinea. Lower Congo, *Hens, Demeuse, Laurent,* and *Dupuis* (ex *Durand & Schinz*). Congo, *Smith,* and *Lockhart* (ex *Martius*). Angola: Huilla; Morro de Lopollo, 5200–5800 ft., *Welwitsch,* 6657!

Mozamb. Dist. British Central Africa: Nyasaland; hilly regions south of Lake Nyasa, *Kirk,* and without precise locality, *Buchanan!*

The Bamboo Palm. In the Yoruba language this palm is variously known as *Igi-oguro, Eriko,* and *Akpako*; its bass-fibre as *Iyo,* and the fishing-lines made from it as *Iyo-oguro* and *Iyo-agbe.* P. Beauvois states that the negroes of Oware and Benin call the wine made from the sap of the trunk *Bourdon.*

6. **R. longiflora,** *Mann & Wendl. in Trans. Linn. Soc.* xxiv. 438, *t.* 39, *fig.* A. *and t.* 42, *fig.* E. A palm 40–50 ft. high. Stems cæspitose, 3–4 together, 15 ft. high, 1 ft. thick. Leaves 33 ft. long; petiole 11–12 ft. long, breaking up at the margins into rigid fibres; leaflets about 160 on either side, coriaceous, 5–5½ ft. long, 2¼–2½ in. wide, spiny on the upper side of the midrib and on the margins near their base, unarmed towards the apex; secondary nerves solitary near the margins, prominent beneath; tertiary nerves 9–10 on either side of the midrib. Spadix with thick branches. Male flowers 12–13 lin. long. Stamens 15. Female flowers 4–5 near the base of the lower branches. Fruit elongate-oval, 3–3¼ in. long, 16–17 lin. thick, crowned by a long oblique mucro; scales in 12 rows, 8 lin. long and wide, very convex, very shallowly

furrowed, obtuse (rarely slightly emarginate) at the base, almost entire at the margins. Seed long ellipsoid, $2\frac{1}{4}$ in. long, 11 lin. thick; albumen with narrow ruminations.—Drude in Engl. Jahrb. xxi. 111.

Upper Guinea. Gold Coast: River Volta, *Rumsey*, 6!

Lower Guinea. Spanish Gaboon: Corisco Island, *Mann*, 1910!

7. **R. Hookeri,** *Mann & Wendl. in Trans. Linn. Soc.* xxiv. 438, *t.* 39, *fig.* B, *t.* 42, *fig.* A. Stem about 30 ft. high, 1 ft. thick. Leaves about 40 ft. long; petiole 10–12 ft. long, breaking up at the edges into curved pendulous fibres; leaflets about 200 on each side, rather rigid, 4–5 ft. long, $1\frac{3}{4}$–2 in. wide, spiny on the upper side of the midrib towards the base and apex and on the keel, glaucous beneath. Spadices in pairs, rarely solitary, from the upper part of the stem, pendulous, densely and compactly branched, slightly glaucous; primary branches about 60; branchlets rigid, the lower 10–11 in. long. Male flowers 9 lin. long. Stamens 16. Female flowers 9–12 at the base of the lower branches. Fruit oval-ellipsoid, $3\frac{3}{4}$–4 in. long, $1\frac{3}{4}$–2 in. thick, obliquely long mucronate; scales in 12–15 rows, 9 lin. by 8 lin., very slightly sulcate, chestnut or cinnamon, obtuse at the base, almost entire. Seed $2\frac{1}{2}$–3 in. by 13–15 lin.; albumen narrowly ruminate.—Drude in Engl. Jahrb. xxi. 111.

Upper Guinea. Old Calabar and Cameroons, in humid places along the coast, *Mann*, 1911! also cultivated.

Lower Guinea. Spanish Gaboon: Corisco Island, *Mann*, 1911!

The Wine Palm. Native name, *Ukot*.

Imperfectly known species.

8. **R. angolensis,** *Rendle in Cat. Afr. Pl. Welw.* ii. 83. Fruit larger than in *R. longiflora*, and longer in proportion to its breadth, $4\frac{1}{3}$ in. by $1\frac{1}{2}$ in; scales almost square, light brown, getting darker towards the blunt base, the largest rather more than 9 lin. each way. Seeds narrowly ellipsoid, blunt and almost flat at the apex, tapering very gradually from above the middle to the base; embryo $\frac{1}{3}$ the way from the apex; rumination similar in character to that of *R. longiflora*, but not so copious.

Lower Guinea. Angola; without precise locality, *Welwitsch!*

9. **R. maxima,** *Pechuel-Loesche, Loango-Exped.* iii. 164; Drude in Engl. Jahrb. xxi. 128; Rendle in Cat. Afr. Pl. Welw. ii. 83.

Lower Guinea. French Congo: Loango, *Pechuel-Loesche*.

Drude suggests that this (which has not been described) may be synonymous with *R. Hookeri*.

6. **CALAMUS,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 931.

Male flower: Calyx cupular, trifid. Petals 3, free or connate at the base, oblong or lanceolate, acute, valvate. Stamens 6, inserted at the base or throat of the corolla; filaments short, free or connate at the base; anthers linear, sagittate or oblong, dorsifixed. Rudiment

of ovary minute or absent. Female flower: Calyx cupular, trifid. Corolla tubular at the base; lobes 3, ovate, acute, valvate. Staminodes 6, united into a cup free from or adnate to the corolla-tube. Ovary ovoid or globose, incompletely 3-celled; style short or long; stigmas short or long; ovules 3, erect. Fruit globose or ellipsoid, 1- (very rarely 2–3-) seeded; style terminal; pericarp covered with retrorsely imbricate scales. Seed various in shape, smooth or sinuously sulcate, suberect; chalaza lateral; branches of the raphe extending from the chalaza to opposite the position of the subbasal or central embryo; albumen homogeneous or slightly ruminate.—Armed, usually slender palms. Stems long climbing, rarely erect, remotely ringed. Leaves remote, equally pinnate; leaflets equidistant or fascicled, usually setose on the nerves and margins; rhachis usually prolonged into a long leafless spiny cirrhus; petiole short or long, trigonous; sheath spiny, sometimes bearing a long spiny flagellum from one side. Spadices short or long, with slender (rarely thick) paniculate branches, polygamous or diœcious; spathes many, tubular; bracts densely imbricate; flowers distichous or subdistichous on the branches, 1 or 2 to each bract; bracteoles free or connate.

Species about 200, chiefly in Tropical and Subtropical Asia, and a few in Australia.

Leaflets linear-lanceolate.
- Fruit ovoid, pointed, brown . . . . . 1. *C. deeratus.*
- Fruit globose, obtuse, mucronate, reddish . . 2. *C. niger.*

Leaflets oblong-lanceolate . . . . . 3. *C. Barteri.*

Leaflets obovate-trapezoid . . . . . 4. *C. Cabræ.*

1. **C. deerratus,** *Mann & Wendl. in Trans. Linn. Soc.* xxiv. 429, *t.* 41, *fig.* F. Stem climbing, 20–25 ft. long. Leaves about 5 ft. long, ovate, patent; sheath cylindrical, tight, unarmed below, with transverse rows of recurved subulate-conical spines above, oblique and furnished with very acute spines at the mouth; petiole semiterete, 3 in. long, 6 lin. thick, slightly channelled above, margins and back with a few erect subulate spines 9–12 lin. long; leaflets linear-lanceolate, much contracted at the base, acuminate, about 35 on each side, alternate, equidistant, 7-nerved, with black bristles on the margins and under (rarely upper) side of the nerves, and minute light brown scales on the undersurface; central leaflets 14–15 in. long, 12–14 lin. wide, 1–1¼ in. apart; terminal leaflets 6 in. long. Spadix elongate, slender, decurved, main axis prolonged into a very long terete naked appendage, primary branches twice or thrice simply branched; peduncle connate at the base with the sheath of the uppermost leaf; spathes long, cylindrical, obliquely split at the apex, the lowest about 1 ft. long, ancipitous and distantly spinulose on the margins, the upper unilateral and sparingly spiny; bracts cup-shaped, obliquely acuminate, bracteoles dense, smaller than the bracts and less acuminate; flower-bearing branches 2 in. long. Male flowers 3 lin. long, solitary, yellow. Calyx cup-shaped, trifid; lobes broadly-ovate. Corolla twice as long as the calyx, tripartite; lobes oblong-ovate. Stamens 6; filaments subulate, united at the base; anthers linear-oblong, sagittate at the base. Rudiment of ovary glo-

bose; stigmas 3, long. Female flower enclosed in a bracteole together with a male or neuter flower, yellow. Calyx and corolla as in the male. Staminodes 6. Ovary oblong; stigmas 3, shortly recurved, triangular. Fruit ovoid, attenuate at the apex, 7–8 lin. long, 4 lin. diam.; scales in 19–21 rows, rather convex, marked with a shallow median furrow, shining, margin membranous, erose, brown. Seed 4–5 lin. long, oblong-ellipsoid, slightly compressed, rugulose; chalaza dorsal, incrassate; albumen horny; embryo basal, erect, close to the hilum.—Drude in Engl. Jahrb. xxi. 111; Cummins in Kew Bulletin, 1898, 80.

Upper Guinea. Sierra Leone: Bagru River, *Mann*, 895! Cameroons: Cameroon River, *Mann*, 2147! Gold Coast: Kibbi, in Akim district, *Johnson*, 242! Ashanti, *Cummins*, 128!

2. **C. niger,** *Willd. Sp. Pl.* ii. 203. A palm armed with many long subulate dark brown spines. Leaves remote; petiole semiterete, 1 in. thick, beset with many short spines; sheath covered with subulate spines; leaflets many, linear-lanceolate, very acuminate, 15 in. long, 4 in. wide, 3-nerved, midrib prominent, margins setigerous; rhachis cirrhiferous above, furnished with uncinate spines. Spadices near the apex of the stem, nodding, paniculately branched; peduncle long. Fruit globose, nearly 1 in. diam., with a short mucro on the obtuse apex; scales reddish when ripe.—J. Braun & K. Schum. in Mitth. Deutsch. Schutzgeb. ii. (1889) 147. *Dæmonorops niger*, Blume, Rumphia, iii. 5. *Dæmonorops melanochætes*, Mart. Palm. iii. 203, partly; Kunth, Enum. iii. 202.

Upper Guinea. Cameroons, *Braun.*
Also in the Malayan Archipelago.

3. **C. Barteri,** *Becc. ex Drude in Engl. Jahrb.* xxi. 134. Stem 30–50 ft. long, about the thickness of the finger. Rhachis of leaf not produced into a cirrhus; leaflets lanceolate-oblong; margins, midrib on both surfaces and secondary nerves on the under surface only beset with fine pungent hairs 1 lin. long. Ultimate branches of the spadix distichous, compressed, 9–14 lin. apart, $2\frac{3}{4}$–$3\frac{1}{4}$ in. long, each bearing 30–40 flowers distichously arranged; bracteoles of the male flowers half as long as the flowers, with two wing-like keels. Calyx $\frac{2}{3}$–$\frac{3}{4}$ as long as the corolla. Corolla narrowed at the base into a short pedicel. Stamens 6, nearly as long as the corolla; anthers versatile, fixed at their centre to the three-sided subulate filaments. Rudiment of ovary shortly trifid, scarcely as long as the filaments. Fruit 6 lin. long, 4–5 lin. in. diam., acuminate; scales in about 20 rows, rhomboid, darker and slightly fimbriate at the margins.

Upper Guinea. Sierra Leone: Musaia, in marshy ground, climbing, *Scott-Elliot*, 5121! Kambia, *Scott-Elliot*, 4738, and without precise locality, *Scott-Elliot*, 4460 (ex *Drude*). Niger Territory: Lower Niger; Onitsa, *Barter*, 110!

In Barter's specimen a cirrhus nearly 2 ft. long, bearing numerous recurved spines, springs from within one of the leaf-sheaths. "Stem much used in the lower part of the river [Niger]," *Barter*. "Used for making rope. Native name '*Tembi*,'" *Scott-Elliot*.

4. **C. Cabræ,** *De Wild. & Durand in Comptes-rendus Soc. bot. Belg.* xxxviii. 151. A climbing shrub. Leaves long; rhachis gradually attenuate upwards and prolonged into an unarmed or slightly armed cirrhus, convex below, slightly rounded above, bearing 1–2 uncinate recurved black-tipped spines 2 lin. long between each pair of leaflets; leaflets nearly equidistant, rather more remote towards the apex, alternate, $2\frac{3}{4}$–$5\frac{1}{2}$ in. long, $1\frac{1}{2}$–$3\frac{1}{2}$ in. wide, obovate-trapezoid, flat, much narrowed and reduplicate at the base, chartaceous, longitudinally plicate, midrib and secondary nerves slightly prominent, margins repando-crenate in the upper part, sparingly spiny, shining on the upper side; "abortive leaflets opposite, the lowest $4\frac{3}{4}$–7 in. distant from the uppermost, 9–14 lin. long, 1–$2\frac{1}{2}$ lin. broad, thick, confluent and thickened at the base, slightly sigmoid, horny, subulate-triquetrous, two faces concave, the upper gradually getting nearer and smaller."

Lower Guinea. Lower French Congo: forests of Mayombe, *Cabra.*

I have seen no specimen of this species, of which the leaves alone are known.

Imperfectly known species.

5. **C. Heudelotii,** *Becc. ex Drude in Engl. Jahrb.* xxi. 112, 134. Petiole short, flat and unarmed above, convex and with recurved spines up to 7 lin. long beneath; sheath tubular, oblique at the mouth, sparingly armed with short stout spines; rhachis in the upper part of the leaf acute and unarmed above, convex and armed with black-tipped recurved spines 3 lin. long beneath; leaflets about 6 lin. apart, linear-lanceolate, gradually acuminate, with pungent upward pointing setæ on both surfaces and margins; terminal cirrhus copiously armed with small recurved spines. Ultimate branches of spadix 2 in. long; bracteoles cupular, irregularly lacerate at the mouth. Fruit ovate, shortly apiculate; scales in about 15 rows, light brown, with a central furrow.—*Calamus sp.*, Mann & Wendl. in Trans. Linn. Soc. xxiv. 430, in note.

Upper Guinea. Senegambia, *Heudelot,* 372! Gambia, *Ingram!*

The material is, as stated by Mann and Wendland (l.c.), insufficient to allow a satisfactory description of this species being drawn up.

7. ONCOCALAMUS, Mann et Wendl.; Benth. et Hook. f. Gen. Pl. iii. 936.

Spadix lateral, monœcious, distichously branched; branches long, pendulous; spathes incomplete. Flowers 11–3 in alternate distichous bracteolate glomerules, the central one female, the rest male. Male flower: Calyx campanulate, shortly 3-lobed. Corolla 3-partite almost to the base. Stamens 6; filaments united into a minutely 6-toothed campanulate cup; anthers cordate, dorsifixed. Rudiment of ovary oblong; style cylindrical; stigmas minute. Female flower: Calyx and corolla as in the male. Staminodes like the filaments of the male flower. Ovary 3-celled; style very short; stigmas 3, tongue-shaped; ovule fixed slightly above the base of the cell. Fruit unknown.—

Climbing palms with long slender stems. Leaves pinnate or bifurcate; rhachis produced into a cirrhus armed with weak spines.

Species 2, endemic.

Leaves pinnate; leaflets about 16 on each side . . 1. *O. Mannii.*
Leaves bifurcate, or pinnate in the upper part only . 2. *O. acanthocnemis.*

1. **O. Mannii,** *Wendl. in Kerchove, Palm.* 252. Stems about 60 ft. long, 6–12 lin. thick. Leaves remote, 5–6 ft. long, dark green, copper-coloured when young; sheaths 1–1½ ft. long, cylindrical, clothed (as well as the rhachis) with dark brown caducous or deliquescent scales; stipules sheathing, 6–9 lin. long, obliquely truncate; rhachis sparingly and minutely spiny at the margins, produced at the apex into a cirrhus 3 ft. long armed with weak deflexed spines 6 lin. long and 1½–2 in. apart, alternate below, opposite above; upper leaflets about 16 on each side, alternate or sub-opposite, long lanceolate, acute, slightly falcate, shining, 9–10 in. long, 12–15 lin. wide, midrib distinct, secondary nerves 6–7 on each side, obscure, margins with minute distant spines; lower leaflets smaller and nearer together. Spadices 4–5 ft. long, dark brown, pendulous, distichously branched, unarmed, naked at the base, clothed above with tubular adpressed sheaths 2 in. long, truncate and irregularly splitting at the mouth; branches 10 in. long, pendulous, alternately distichous, naked and adpressed to the spadix below, clothed above with infundibuliform imbricate bracteoles splitting down one side. Flowers fascicled, in the lower part of the branch in groups of 11, at the apex of 3, the central one female and ebracteolate, the lateral male, in equal numbers on each side of the female, bracteolate.—*Calamus* (*Oncocalamus*) *Mannii,* Wendl. in Trans. Linn. Soc. xxiv. 436, t. 41, fig. E, t. 43, fig. E.

Upper Guinea. Lagos: Ebuti Metta, *Millen,* 18! Lagos Island, *Barter,* 20220!

Lower Guinea. Gaboon: Gaboon River, *Mann,* 1044! and on the Sierra del Crystal, 1500 ft., ex *Mann.*

2. **O. acanthocnemis,** *Drude in Engl. Jahrb.* xxi. 111, 133. Stem slender, reed-like, 3 lin. thick; sheaths long, cylindrical, sparsely covered all over with blackish reflexed spines. Leaves very shortly petioled, simply bifurcate or irregularly pinnately divided between the upper nerves; lobes broadly lanceolate and acute when the leaf is simply bifurcate, or when more divided the upper lobes narrowly linear-lanceolate and 9–14 lin. apart, bearing marginal spines ½ lin. long; primary nerves about 8 on each side, prominent on the upper surface, scarcely raised on the lower; cirrhus many times longer than the very short midrib, armed with slender spines, destitute of larger prickles. Inflorescence and fruit unknown.

Lower Guinea. Gaboon: in intertwining masses (bushropes) in the woods, *Büttner,* 527, 529; Gaboon River, *Mann,* 1044A! Congo: Bolobo, *Hens,* C, 170!

8. EREMOSPATHA, Mann et Wendl.; Benth. et Hook. f. Gen. Pl. iii. 936.

Flowers hermaphrodite. Calyx campanulate, 3-toothed. Corolla

urceolate; lobes 3 short, acute, valvate. Stamens 6, perigynous; filaments short, broad, connate; anthers cordate, fixed near the base at the back, Ovary 3-celled; stigmas 3, lingulate; ovule subbasal. Fruit baccate, 1- (rarely 2–3-) seeded; scales thin, fragile; endocarp membranous. Seed peltate, slightly rugose; hilum linear; raphe linear, its branches radiating from the hilum; albumen homogeneous; embryo ventral.—Climbing palms. Stems long, slender, ringed. Leaves equally pinnate, subsessile; leaflets alternate and opposite; rhachis bearing weak spines, produced at the apex into a long cirrhus bearing opposite decurved spines (reduced leaflets). Spadices short; peduncle and branches compressed, distichous, thick, patent; spathes none; bracts minute.

Species 3, endemic.

Leaflets elliptic-obovate		1. *E. Hookeri.*
Leaflets long lanceolate.		
Fruit scales in 18 rows.	Leaflets acuminate	2. *E. cuspidata.*
Fruit scales in 24 rows.	Leaflets acute	3. *E. macrocarpa.*

1. **E. Hookeri,** *Wendl. in Kerchove, Palm.* 244. Stem 6 lin. thick. Leaves 4–5 ft. long; sheath tubular, glabrous, produced at the apex into an obliquely truncate ochrea 6–9 lin. long; rhachis 6 lin. thick at the base, prolonged at the apex into a cirrhus unarmed except for the recurved spines representing reduced leaflets; leaflets 12–14 on each side, the basal ones rather closer together than the upper, elliptic-obovate, 6–7 in. by 2–2¼ in., flat, thin; central nerve and 5 secondary nerves rather prominent on both surfaces; upper margin slightly repand-crenate, lower furnished with a few spines 2 lin. long. Spadix long peduncled, 1½–2 ft. long; rhachis slightly compressed, simply and distichously branched; branches 14–22, patent; bracts transversely-oblong, acuminate. Fruit ovoid-cylindric, 10–12 lin. long, 8–9 lin. in. diam., 1- (rarely 2-) seeded, with 20 rows of rhomboid scales. Seed peltate, 9 lin. long, 6 lin. wide, 3 lin. thick.—Drude in Engl. Jahrb. xxi. 111. *Calamus* (*Eremospatha*) *Hookeri*, Mann & Wendl. in Trans. Linn. Soc. xxiv. 434, t. 41, fig. C.

Upper Guinea. Niger Delta: at the mouth of the River Nun (Niger), *Mann*, 451! West Tropical Africa: without exact locality, *Kalbreyer*, 65! Cameroons: Barombi, *Preuss*, 460, and on the banks of the river near Ndian Factory, *Dusén* (ex *Drude*).

South Central. Congo Free State: Monbuttu; by Kambele River, *Schweinfurth*, 3671 (ex *Drude*).

2. **E. cuspidata,** *Wendl. in Kerchove, Palm.* 244. Stem 1 in. thick. Leaves 6–7 ft. long; sheath tubular, smooth, about 1 foot long, produced at the apex into an obliquely truncate ochrea 1 in. long; rhachis 6 lin. thick at the base, produced at the apex into a long cirrhus bearing sigmoid subulate triquetrous recurved spines, with 1–2 uncinate spines between each pair of leaflets; leaflets 25–27 on each side, basal rather nearer together than the upper, opposite or alternate, 8–9 in. by 10–12 lin. long, lanceolate, acuminate into a point 1–2 in. long, chartaceous, glabrous on both surfaces, with more numerous and

more slender spiny cilia on the margins than in *E. macrocarpa*. Midrib rather prominent, secondary nerves 6 on each side. Spadix 18–20 in. long, on a peduncle 1 foot long; branches 20–30, patent, 2 lin. thick; bracts transversely oblong, acuminate. Flowers in pairs, sessile. Calyx campanulate, 3-toothed, 2 lin. long, rigid, obscurely striate. Corolla 5 lin. long, much inflated, thick, 3-toothed. Stamens 6; filaments connate for the greater part of their length into a tube and adnate to the corolla; anthers erect, cordate, inserted at the base on the dorsal side, introrse. Ovary ovoid-globose, 3-celled; style short; stigmas 3, lingulate, ciliate. Fruit ellipsoid, 1 in. long, about 9 lin. diam., 1- (rarely 2-) seeded, with 18 rows of rhomboid scales. Seed slightly compressed, 9 lin. long, 5 lin. wide, 3–4 lin. thick, brown; chalaza dorsal, much thickened; hilum linear; embryo ventral, about half-way up the albumen.—Drude in Engl. Jahrb. xxi. 111. *Calamus* (*Eremospatha*) *cuspidatus*, Mann & Wendl. in Trans. Linn. Soc. xxiv. 434, t. 41, fig. A.

Lower Guinea. Gaboon: at the mouth of the River Gaboon, *Mann*, 1043!

3. **E. macrocarpa,** *Wendl. in Kerchove, Palm.* 244. Stem 30–50 ft. long, scarcely 1 in. thick. Leaves about 9 ft. long; sheath tubular, about 1 ft. long, produced at the apex into an obliquely truncate ochrea 1 in. long, clothed with brownish evanescent scurf; rhachis 4–5 lin. thick at the base, bearing uncinate spines, produced into a cirrhus bearing 7–11 pairs of decurved subulate-triquetrous spines, but otherwise unarmed; leaflets about 23 on each side, the upper rather wider apart than the lower, long lanceolate, acute, slightly dentate, papery, rigid, glabrous, shining, with brown spiny cilia 1–2 lin. long on the margins, the upper 14 in. by 12–13 lin., the lower gradually decreasing in size, midrib rather prominent, secondary nerves 6 on each side. Spadix $1\frac{1}{2}$–2 ft. long, glabrous, simply and alternately distichously branched; peduncle 6–8 in. long, nearly 6 lin. thick, concave on the face, convex on the back; branches 4–5 in. long, 1 lin. thick at the base; bracts semi-amplexicaul, ovate, acuminate, 3 lin. long, marcescent. Flowers as in *E. cuspidata*. Fruit $1\frac{1}{4}$ in. long, compressed cylindrical, very shortly attenuate at the base, 1- (rarely 2-) seeded, with 24 rows of rhomboid rather flat scales, 2 lin. wide. Seed compressed, 9–12 lin. long, 9 lin. wide, 4–5 lin. thick, brown; chalaza incrassate and forming a mammilla on the dorsal side; embryo ventral, a little above the hilum. —Drude in Engl. Jahrb. xxi. 111. *Calamus* (*Eremospatha*) *macrocarpus*, Mann & Wendl. in Trans. Linn. Soc. xxiv. 435, t. 41, fig. B, and t. 43, fig. B.

Upper Guinea. Sierra Leone: Bagru River, *Mann*, 1! Niger Territory: Old Calabar River, *Mann*, 2330!

9. ANCISTROPHYLLUM, Mann et Wendl.; Benth. et Hook. f. Gen. Pl. iii. 937.

Flowers hermaphrodite. Calyx campanulate, shortly 3-lobed. Corolla-tube short; lobes 3, linear-oblong, acute, valvate. Stamens 6;

filaments adnate to the corolla, lingulate or clavate; anthers elongate, sagittate, dorsifixed. Ovary 3-celled, attenuate into a long slender style; stigmas 3, short; ovules erect. Fruit baccate, 1-seeded, oblong, clothed with retrorsely imbricate scales. Seed oblong, compressed, smooth, erect; hilum basal; raphe linear, reaching almost to the apex on the dorsal side and then with obscure branches; chalaza dorsal, slightly incrassate and pressed into the albumen; albumen homogeneous, hard; embryo ventral, horizontal, about half-way up the albumen. —Monocarpic, climbing palms. Stems cæspitose, slender, elongate. Leaves remote, alternate, equally pinnate; leaflets somewhat aggregate or alternate; rhachis produced at the apex into a long cirrhus; sheath spiny, produced into a long ochrea. Spadix terminal, distichously branched; spathes many, incomplete; bracts spathaceous, enclosing 2 flowers; bracteoles united into a bicuspidate cup.

Species 3, endemic.

Petiole long. Leaflets broad. Seed round.
- Leaflets unarmed at the margins . . . . 1. *A. læve.*
- Leaflets with spiny cilia at the margins . . . 2. *A. opacum.*

Petiole short. Leaflets narrow. Seed compressed . 3. *A. secundiflorum.*

1. **A. læve**, *Drude in Engl. Jahrb.* xxi. 111. Stem climbing, slender, 30–40 ft. long, annulate, unarmed. Leaves 4–5 ft. long, 9–12 in. apart, covered with easily removable dark brown tomentum, becoming glaucous; sheath about 1 ft. long, tubular, closely adpressed to the stem, bearing solitary horizontally patent spines towards its apex, produced at the apex into an ochrea 1 ft. long, splitting down one side and clothed with very strong scattered compressed subulate spines; petiole 8–9 in. long, 3 lin. wide, flat above, convex beneath, bearing remote recurved spines thickened at the base; rhachis gradually attenuate upwards, convex on the back, spiny on the margins, compressed in the upper part and produced into a cirrhus 1–1½ ft. long, bearing 4–6 alternate much-reduced leaflets; leaflets in 9–13 opposite or subopposite clusters, broadly elliptic-lanceolate, acuminate, narrowed at the base, slightly falcate, smooth and shining on both surfaces, unarmed, with 2 (rarely 1) primary nerves prominent below, central ones 7–9 in. long, 1½ in. wide, the lowest smaller and slightly deflexed. Spadix ovate, 1½–2 ft. long; primary branches 6–8, the lowest somewhat recurved and simply branched; lowest branchlets 4–5 in. long; spathes tubular, obliquely splitting, very spiny, produced at the apex into a tail several in. long; bracts 1 in. long, tubular, inflated, obliquely truncate, very long acuminate on one side at the apex; bracteoles very numerous, 2–3 lin. long. Flowers distichous, patent, geminate, each pair subtended by a more or less concave bracteole, shortly pedicelled. Calyx campanulate, 2 lin. long, trifid; lobes ovate, acuminate, rigid, striate on the back. Corolla 4 lin. long, yellow; lobes 3½ lin. long, 1 lin. wide, long lanceolate, acute, thickened at the margins, valvate, rather rigid, concave, striate. Stamens 6, a little shorter than the corolla; filaments thick, tongue-shaped, acute, 1½ lin. long; anthers bifid at the base, 1 lin. long, yellow, fixed at the centre of the back. Ovary

globose; style columnar, 2 lin. long, hollow inside; stigmas 3, oblong, short, 3-celled; ovules solitary. Fruit-scales in about 18 rows, fimbriate, straw-coloured, brown at the margins.—*Calamus* (*Laccosperma*) *lævis*, Mann & Wendl. in Trans. Linn. Soc. xxiv. 430, t. 38, fig. B.

Lower Guinea. Gaboon: in shady virgin forests in the neighbourhood of the Gaboon River, *Mann*, 1045! Munda, *Soyaux*, 155 (ex *Drude*).

2. **A. opacum,** *Drude in Engl. Jahrb.* xxi. 111 Stem 25–30 ft. long, soboliferous. Leaves patent, 6–8 ft. long, clothed with easily removable brownish tomentum; sheath 1 ft. long, tubular, closely investing the stem, armed towards the apex with scattered ancipitous subulate spines 6 lin. long, yellow at the base and black at the apex, produced at the apex into an ochrea 6–12 in. long, bearing spines like those on the sheath; rhachis convex on the back, flattened on the upper side near the base, but acute towards the apex, produced at the apex into a filiform cirrhus 2½–3 ft. long, bearing 4–6 reduced hook-like leaflets, the lower alternate and 4–6 in. apart, the upper opposite, smaller and nearer together, margins densely covered with recurved spines throughout; leaflets in opposite clusters, long- or elliptic-lanceolate, contracted at the base, acuminate, marcescent, opaque, distantly spiny on the margins, falcate, prominently 1–4- (rarely 5-) nerved, 8–12 in. by 1–4 in. Spadix ovate, 1½–2½ ft. long; primary branches patent, the lower 1–1¼ ft. long; branchlets alternately distichous, turned to one side, pendulous, 4–8 in. long, slender. Flowers geminate, alternately distichous, shortly pedicellate, patent. Calyx campanulate, nearly 2 lin. long, thickened at the base, rather rigid; lobes broadly ovate, acute. Corolla nearly 4 lin. long; lobes elliptic-lanceolate, acute, rigid, concave, striate on the back, valvate. Stamens 6, slightly shorter than the corolla; filaments thick, tongue-shaped, acute, adnate to the base of the corolla; anthers elongate, bifid at the base, dorsifixed. Ovary globose; style columnar, 2 lin. long; stigmas 3, oblong, fimbriate; ovules solitary, inserted a little above the base of the cell. Fruit baccate, 1-seeded, globose, 6 lin. in diam.; scales in 12 rows, membranous, with an obscure longitudinal furrow, straw-coloured, darker at the margins. Seed subglobose, deeply channelled, 5 lin. in diam., with a deep pit bearing a central mammilla on the dorsal side; raphe linear; albumen hard; embryo ventral, horizontal, about half-way up the albumen.—Cummins in Kew Bulletin, 1898, 80. *Calamus* (*Laccosperma*) *opacus*, Mann & Wendl. in Trans. Linn. Soc. xxiv. 431, t. 41, fig. D, and t. 43, fig. D. *Laccosperma opacum*, J. Braun and K. Schum. in Mitth. Deutsch. Schutzgeb. ii. (1889), 148.

Upper Guinea. Gold Coast: Ashanti; Assin-Yan-Kumassi, *Cummins*, 229! Cameroons: Barombi, *Preuss*, 307 (ex *Drude*). Fernando Po: in shady woods from the shore to 1000 ft., *Mann*, 97!

3. **A. secundiflorum,** *Wendl. in Kerchove, Palm.* 230. A cæspitose, widely climbing palm. Stem 50–60 ft. long, 1¼ in. in diam., unarmed. Leaves 12–14 ft. long, 1–1½ ft. apart, pale green; sheath 1–1½ ft. long, cylindrical, with short scattered conic-subulate spines 1–2 lin. long near the apex only, produced at the apex into a long

ochrea; petiole 4 in. long, 9 lin. in diam., concave above, convex beneath, spines marginal, remote, subulate from a thickened base, black at the apex, recurved; rhachis gradually attenuate upwards, convex and unarmed on the back, convex on the face in the lower part, acute-angled in the upper, with very slender subulate straight or slightly curved spines 3–6 lin. long between the leaflets; cirrhus 5–6 ft. long, unarmed or slightly spiny; reduced leaflets up to 18, recurved, much thickened at the base, flattened or triangular above, the lowest alternate, 4–8 in. apart, 2 in. long, 3 lin. wide, the upper opposite and confluent at the base, getting gradually smaller and closer together; leaflets 45–55 on each side, linear-lanceolate, acuminate, abruptly contracted at the base, with spiny cilia on the margins, rather rigid, straight, with 1–2 nerves rather prominent and remotely spiny on the upper side, the lowest approximate, 4–5 in. long, 6 lin. wide, the central 12–13 in. long, 9–18 lin. wide, the upper rather more distant. Spadix broadly ovate, 4–6 ft. long; primary branches 10–15, about 3 ft. long; bracts cylindrical, obliquely truncate, unarmed, smooth, adpressed; flower-bearing branches 1 ft. long, slender, distichous, pendulous, turned to one side; bracteoles narrowly campanulate, 2 lin. long, obliquely truncate. Flowers geminate, yellowish, shortly pedicellate, horizontally patent. Calyx nearly 2 lin. long, campanulate, smooth, thickened at the base; lobes semi-oblong, rather acute. Corolla 4 lin. long; lobes linear-oblong, shortly acute, rather thick, patent, valvate, 1–1½ lin. wide, convex, faintly striate. Stamens 6, shorter than the corolla; filaments thickened, compressed; anthers 2 lin. long, linear, bifid at the base, introrse. Ovary globose, 3-celled; style columnar; stigmas 3, oblong; ovule erect. Fruit baccate, 1-seeded, orange-colour when fresh, brown when dry, 6 lin. long, 4–5 lin. in diam., oblong, compressed; scales in 17 rows, membranous, brown, chestnut-brown and scabrid on the margins. Seed smooth, oblong, compressed, obtuse or slightly bilobed at the base, very shortly mucronate at the apex, 4–5½ lin. long, 3–4 lin. wide, 2½ lin. thick, fixed at the lower end; hilum roundish; raphe linear, passing into an adpressed mammilla; chalaza in the upper half of the seed; testa chestnut-brown, smooth, somewhat shining; albumen homogeneous, horny, impinged upon on the dorsal side by the testa and the raphe; embryo ventral, horizontal, about half-way up the albumen.—Hook. f. in Kew Report, 1882, 69; Drude in Engl. Jahrb. xxi. 111. *Calamus secundiflorus*, Beauv. Fl. Owar. i. 15, tt. 9–10; Mart. in Münch. gel. Anzeig. 1838, 639, and Palm. iii. 341; Tuckey, River Congo, 457; Schweinf. Beitr. Fl. Aethiop. 291. *C.* (*Ancistrophyllum*) *secundiflorus*, Mann & Wendl. in Trans. Linn. Soc. xxiv. 432, t. 38, fig. D, t. 41, fig. G, t. 43, fig. C; Durand & Schinz, Études Fl.Congo, i. 272. *C. Schweinfurthii*, Becc. ex Drude in Engl. Jahrb. xxi. 111.

Upper Guinea. Sierra Leone, *Afzelius!* Niger Delta: mouth of the River Nun, *Mann*, 453! and along the coast from the equator to Sierra Leone, ex *Mann.* Benin, *Beauvois* (ex *Drude*). Niger Expedition, without precise locality, *Barter*, 61! Old Calabar, *Milne!* Cameroons; Barombi, *Preuss*, 389 (ex *Drude*).

Nile Land. British East Africa: Niamniam; at Mansilli Brook, *Schweinfurth*, 2860!

Lower Guinea. Lower French Congo: Mayombe, *Laurent*. Lower Congo, *Smith*. Angola: Golungo Alto; Trombeta, *Welwitsch*, 6669 ! 6669B !

South Central. Congo Free State: Lunda, *Buchner*, 687 (ex *Drude*).

10. **BORASSUS**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 939.

Male flowers small, densely packed in pits on the catkin-like branches of a simply branched interfoliaceous spadix, subtended by scaly bracts. Sepals 3, narrow, free, imbricate. Petals united below into a long stipes, glumaceous, obovate-spathulate, patent, imbricate. Stamens 6; filaments very short, subulate; anthers large, oblong, basifixed. Ovary represented by 3 setæ. Female flower much larger than the male, globose. Sepals reniform, imbricate, fleshy. Petals similar to the sepals, but smaller. Staminodes 6–9 inserted at the base of the petals. Ovary 3-celled, entire or tripartite; stigmas sessile, recurved; ovule basal, erect. Fruit large, subglobose, enclosing 3 pyrenes; pericarp thinly fleshy; pyrenes obcordate, densely fibrous outside. Seed with its testa adhering to the endocarp; albumen homogeneous, horny, hollow; embryo near the apex of the seed.—Tall, unarmed palm. Stem robust, annulate, thickened at or above the middle, sometimes branched at the apex. Leaves in a terminal crown, large, flabellate; segments induplicate, bifid, margins smooth; ligule short, rigid; petiole spiny; sheath short. Spadices large; spathes at the base of the branches, incomplete; male branches densely covered with multiseriate densely imbricate bracts; female branches thick, rather tortuose, fewer-flowered than the male. Flowers diœcious. Fruit brown.

Species 1 in Tropical Africa, extensively cultivated in India, and probably wild in the regions around the mouth of the Indus.

1. **B. flabellifer,** var. **æthiopum,** *Warburg in Engl. Pfl. Ost-Afr. B.* 20, *C.* 130. Stem 60–70 ft. high, thicker above the middle, the younger part clothed with the persistent bases of old leaves. Leaves flabellate, broader than long, divided to the middle, 5–12 ft. long; segments lanceolate-ensiform; petiole straight, slightly sheathing at the base, concave above, convex below, spiny on the margins; sheath breaking up into filaments. Male inflorescence: Spadix 3–6 ft. long, simply branched; peduncle slightly compressed; branches subterete, bearing at their apex 2–3 sessile cylindrical catkins 12 in. by 2 in.; spathes solitary at the base of and as long as each branch; bracts imbricate, 2 lin. long. Calyx tubular; lobes 3, oblong, obtuse, erect. Corolla-tube as long as the calyx; lobes 3, oblong, obtuse, concave, patent, yellowish-green. Stamens 6, patent; filaments subulate. Female inflorescence: Spadix simple, 4–8 ft. long, nodding; spathes 6–12, arranged as in the male. Sepals reniform, imbricate, concave. Petals half as long as the sepals, gibbous, shining. Staminodes 6, rudimentary. Drupe ovoid, obtuse, obscurely trigonous, smooth, coriaceous, orange-coloured; epicarp containing fibres. Seeds 3, ovoid, compressed.—Drude in Engl. Jahrb. xxi. 110; Dammer in Engl. Jahrb. xxviii. 355. *B. flabelliformis*, Murr. Syst. ed. 13, 827; Schumach. & Thonn. Beskr.

Guin. Pl. 443; R. Br. Vermischte Schriften, i. 269; Kirk in Journ. Linn. Soc. ix. 232. *B. æthiopum*, Mart. in Münch. gel. Anzeig. 1838, 639, and 1839, 46, and Palm. iii. 220; Hook. Niger Fl. 526; Speke, Nile, Append. 651; Mann & Wendl. in Trans. Linn. Soc. xxiv. 439; Henriques in Bolet. Soc. Bot. v. 206; J. Braun in Mitth. Deutsch. Schutzgeb. ii. (1889), 147.

Upper Guinea. Senegal, *Ronn.* Senegambia, *Brunner!* Gorea (Goree), *Döllinger.* Gambia, *Adanson.* Gold Coast: River Volta, *Isert;* Accra, *Hort. Sander.!* Ashanti, *Thonning*, *Afzelius.* Benin, ex *Martius.* Niger Territory: Nupe, *Barter*, 792! Isolated on the coast, *Mann.* Cameroons, ex *Braun.*

Nile Land. British East Africa: "Very few about the equator, plentiful in the Shiluk country" (bordering the White Nile), ex *Speke & Grant*, 71.

South Central. Congo Free State: Kasai River, *Buchner* (ex *Drude*).

Lower Guinea. Island of St. Thomas, ex *Henriques.* Lower Congo, *Naum, Laurent.* Congo, ex *Brown.*

Mozamb. Dist. German East Africa: in the Unyamwezi district, ex *Speke & Grant.* Makutu Steppe, between Khutu and Uhehe districts, *Goetze;* Khutu; Kisaki Steppe, amongst hills not far from Msoro (River) and Msengere, *Goetze.*

Native names. Vjye-Tjo, ex *Schumacher & Thonning.* Deleb Palm, M'vooma. In Unyamwezi district the young ones are called "Meelalla," and the leaves furnish thatch, rope, sieves, fences, firewood, and flageolet reeds, the roots are boiled and eaten in times of famine, and a sweet insipid toddy is extracted, whilst on the Nile the leaves are made into strong white baskets and mats for markets, according to *Speke & Grant.*

11. **HYPHÆNE**, Gærtn.; Benth. et Hook. f. Gen. Pl. iii. 940.

Male flowers: Sepals linear-oblong, imbricate, connate at the base. Petals broadly ovate, obtuse, concave, imbricate, connate at the base into a short stalk. Stamens 6; filaments short, subulate; anthers linear, inserted at the bifid base. Rudiment of ovary none. Female flowers larger than the male, very shortly pedicellate. Sepals 3, ovate-orbicular, obtuse, imbricate. Petals a little smaller than the sepals, broadly ovate, obtuse, imbricate. Staminodes 3, connate into a membranous ring. Ovary subglobose, obscurely 3-lobed, 3-celled; stigmas 3, minute, sessile, terminal, at length excentric; ovule attached by a broad base to the side of the cell. Fruit sessile or stalked, terete or obscurely lobed, often flat or intruded at the base and apex, 1-celled; stigma basal; pericarp fibrous, with a shining epidermis; endocarp woody, fleshy inside. Seed adnate to the endocarp, erect, ovoid or obovoid, intruded at the base; testa very hard, fuscous; raphe reticulately branched; albumen homogeneous, hollow; embryo apical.—Unarmed except for the spines on the petioles. Stem cylindrical or ventricose, simple or dichotomously branched. Leaves in a terminal crown, orbicular or flabellate; segments ensiform; petiole concavo-convex, plano-convex or more rarely bi-convex; sheath short, open; ligule oblique or equilateral. Spathes cylindrical, incomplete; spadices dicœcious, male and female similar; spadix-branches alternate; flower-bearing

branches subfastigiate; bracts semicircular, very densely imbricate; bracteoles membranous, bearded.

A genus of about 15 species, extending into Arabia and Madagascar. Many of the species are described from imperfect material and are ill-defined.

Stem cylindrical.
- Stem dichotomous.
  - Fruit turbinate-pyriform, shallowly furrowed . 1. *H. coriacea.*
  - Fruit long pyriform, obtusely keeled . . . 2. *H. Wendlandii.*
  - Fruit obliquely ovoid, obscurely trigonous . . 3. *H. thebaica.*
- Stem unbranched.
  - Petiole concavo-convex. Fruit shortly turbinate . 4. *H. guineensis.*
  - Petiole deeply channelled above; ligule equilateral. Fruit oblong or obovoid . . 5. *H. crinita.*
  - Petiole plano-convex; ligule oblique. Fruit oblique at the base . . . . . 6. *H. Goetzei.*
- Stem ventricose . . . . . 7. *H. ventricosa.*

1. **H. coriacea,** *Gærtn. Fruct.* i. 28, *t.* 10, *fig.* 2. Stem 30 ft. high, dichotomously branched. Fruit turbinate-pyriform, shallowly furrowed, broadest above the middle, flat at the apex; fibres of the pericarp shorter than the triangular putamen; cavity of putamen oblong. Seed ovoid-ellipsoid, attached by its centre.—Mart. in Münch. gel. Anzeig. 1838, 639; Kirk in Journ. Linn. Soc. ix. 234; Wendl. in Bot. Zeit. 1881, 93; Engl. Pfl. Ost-Afr. B. 25, C. 130; Drude in Engl. Jahrb. xxi. 110, 122. *Corypha africana*, Lour. Fl. Cochinch. 213; Wendl. in Kerchove, Palm. 247.

Mozamb. Dist. German East Africa: on the coast, Usambara, *Holst*, 3172, 3174 (ex *Drude*); on the Rovuma River, 8–12 miles from the sea coast, *Kirk*. "Eastern Africa, in woods," ex *Loureiro*.

Kirk (l.c.) distinguishes two varieties thus:—(1) Stem 30 ft. high, much branched; fruit smaller and less flattened than in the following. (2) Often a bush with a small stem rarely branched more than once; fruit deep brown, much flattened at the apex. The latter, which is said to be abundant at the mouth of the Zambesi, may be the same as Drude's variety *minor*, from Pondoland (Engl. Jahrb. xxi. 110, 122).

Also in Madagascar.

2. **H. Wendlandii,** *Dammer in Engl. Jahrb.* xxviii. 353. A tree 65–82 ft. high, usually much branched. Leaves flabellate, 3¼ ft. long, 4½ ft. broad; petiole concavo-convex in the lower part, plano-convex above, glabrous, with dark brown curved spines 7–16 lin. apart on the margins; ligule very oblique, aculeate-dentate; rhachis prolonged nearly to the middle of the leaf, densely spiny above the base; lamina with about 48 lobes, minutely spiny on the nerves above the base. Male inflorescence racemose; branches bearing 1–4 spikes 6–8 in. long near the apex; bracts cylindrical, oblique, acute; bracteoles widely cochleariform, truncate, bearded at the sides. Calyx membranous, turbinate, 1½ lin. long, 3-toothed. Corolla 3-partite; lobes oblong, obtuse. Stamens 6; filaments subulate, the three inner dilated at the base, 1 lin. long. Rudiment of ovary very minute. Female inflorescence racemose, 2–2½ ft. long; branches bearing 1, rarely 2, cylindrical spikes at the apex about 8 in. long, 4 lin. in diam.; bract

cylindrical, oblique, acute; bracteoles widely cochleariform, truncate, bearded at the sides. Calyx 3-partite, pilose outside the base; lobes ovate, fleshy, 2 lin. long. Corolla 3-partite; lobes long, oval, membranous, $1\frac{1}{2}$ lin. long. Staminodes none. Ovary conical; stigmas 3, sessile. Fruit pedicellate, long pyriform, obtusely keeled, 5 lin. long, oblique at the base. Seed with bony albumen; embryo cylindrical, near the apex of the seed.

Mozamb. Dist. German East Africa: Khutu; in the Kisaki Steppe, by the Rufiji River, 820 ft., *Goetze*, 69.

Native name, Mkase.

3. **H. thebaica,** *Mart. Palm.* iii. 225, *tt.* 131–133. Stem terete, 10–30 ft. high, about 1 ft. in diam., simple or more frequently dichotomously branched. Leaves 20–30 in a terminal crown on each branch; petiole sheathing at the base, triangular below, plano-convex upwards, spiny on the margins, with rusty tomentum; lamina suborbicular; lobes 20 or more, linear-lanceolate, acuminate, $1\frac{1}{2}$ ft. long, 1 in. wide; primary nerves thick, concave above, secondary numerous. Male spadix 4 ft. long, 1–2 in. thick at the base, at first erect, afterwards patent; spathes nearly cylindrical; flower-bearing branches 6–10 in. long, 3–2 at the end of branches 3–4 in. long; bracteoles $\frac{1}{2}$ lin. long; flowers in pairs, shortly pedicellate. Calyx 3-lobed, contracted below. Corolla stipitate; lobes widely ovate, obtuse, concave. Stamens 6, rarely 7; filaments subulate from a thickened base; anthers linear, slightly sagittate, nearly basifixed. Rudiment of ovary absent. Female spadix like the male; bracteoles densely imbricate, with a transverse line of tomentum half-way up the back; flowers very shortly pedicellate. Calyx-lobes orbicular-ovate, light green. Petals smaller than the sepals, orbicular-ovate, concave. Staminodes 6. Ovary globose or 3-lobed; stigmas sessile or nearly so. Fruit of 1 (rarely 2–3) obliquely-ovoid carpel, 3 in. long, $2\frac{1}{4}$ in. in diam. Seed ovoid.—Mart. in Münch. gel. Anzeig. 1838, 639, and 1839, 51; Grant in Trans. Linn. Soc. xxix. 187; Speke, Nile, Append. 651; Penzig in Atti Congr. Bot. Genova, 1892, 363; Schweinf. Beitr. Fl. Aethiop. 193, 291, and in Bull. Herb. Boiss. ii. App. ii. 52. *Cucifera thebaica*, Del. Fl. Égypte, 1, tt. 1–2.

Upper Guinea. Gambia: on the banks of the River Gambia, *Whitfield!* Bornu, ex *Drude*.

Nile Land. Nubia: near Alt Dongola, *Ehrenberg* (ex *Schweinfurth*). Eritrea: Arkiko and Monkullo, near Massowa, and in the valley of the River Barca, ex *Penzig*. Kordofan, Sennar, Abyssinia and Bahr-el-Abiad (White Nile), ex *Schweinfurth*; White Nile, *Flower! Speke & Grant.* Somaliland: Schebeli, *Donaldson Smith*, 1! British East Africa: Lamo (Lamu Island), *Kirk*, 1!

Also found in extra-tropical Egypt and Arabia.

Native names: at Berber "Mohamma," at Tigre "Ssehhelib." "At Berber the leaves are made into coarse rope, and the trunks into beams and posts" (*Speke & Grant*). Although this species is frequently mentioned by travellers as the Doum or Dum palm, it is very poorly represented in British herbaria.

4. **H. guineensis,** *Schumach. & Thonn. Beskr. Guin. Pl.* 445. Stem tall, cylindrical, the younger part armed with the bases of old

leaves. Leaves roundish ovate, broader than long, plicate, divided to the middle into ensiform replicate segments, subpinnately palmate, 2–6 ft. long; petiole as long as the lamina, slightly concave above, convex below, spiny on the margins, widened and having a fibrous network on either side at the base. Male inflorescence: Spadix simply branched, 2–5 ft. long; peduncle slightly compressed; branches alternate, woolly, acute at the margins, bearing near their apices 2–3 sessile cylindrical catkins 1 ft. long and 1 in. thick, clothed with numerous imbricate adpressed bracts 1 lin. long and 6 lin. broad. Flowers in 6–8 rows, 2–3 enclosed in each scale. Calyx trigonous; lobes 3, oblong, obtuse, erect, concealed by the bracts. Corolla-tube as long as the calyx; lobes 3, exserted, rotate, oblong, obtuse, concave, subcartilaginous, green. Stamens 6, inserted in the corolla-tube, patent; filaments subulate, a little shorter than the corolla; anthers oblong. Rudiment of ovary none. Female inflorescence similar to the male. Fruit shortly turbinate, very obtuse, obscurely trigonous, shining; epicarp chartaceous, thin; mesocarp fibrous, rather sweet; endocarp hard, with an apical pore. Seed cartilaginous, hollow in the centre.—Drude in Engl. Jahrb. xxi. 110; Durand & Schinz, Conspect. Fl. Afr. v. 461, and Études Fl. Congo, i. 274; Giissfeldt & Pechuel-Loesche, Die Loango-Exped. i. t. 1; Rendle in Cat. Afr. Pl. Welw. ii. 83.

Lower Guinea. Estuary of the Congo: Isle of Mateba, *Dupont*. Loango, ex *Drude*. Angola: plentiful on dry or sandy hills, especially between Barra do Bengo and Barro do Dande, *Welwitsch*, 6662! Ambriz; maritime hills near Quizembo, *Welwitsch*, 6668! along long tracts of coast from Dande and Lifune as far as the mouth of the River Cuanza, *Welwitsch*, 6670! Loanda; on the coast between Ambriz and Loanda, *Welwitsch*, fruit 1052! Guinea, without exact locality, *Thonning*.

Native name, Songu-Tjo, ex *Schumacher & Thonning*.

5. **H. crinita,** *Gærtn. Fruct.* ii. 13, *t.* 82, *fig.* 4. Stem 20–30 ft. high, more or less flexuose or erect, undivided. Leaves large, with fibres between the lobes, covered on both surfaces with very fugacious white tomentum, scabrous on the margins and upper sides of the nerves; ligule large and nearly equilateral; petiole sheathing at the base, spiny on the margin, deeply channelled above. Fruit oblong or obovate, depressed, smooth; pericarp containing numerous fibres shorter than the thick subglobose putamen. Seed attached below its centre.—Mart. Palm. iii. 227; Kirk in Journ. Linn. Soc. ix. 235; Wendl. in Bot. Zeit. 1881, 92; Engl. Pfl. Ost-Afr. C. 130; Drude in Engl. Jahrb. xxi. 110, 122; C. H. Wright in Dyer, Fl. Cap. vii. 30. *H. natalensis*, G. Kunze in Linnæa, xx. 15; Gard. Chron. 1890, viii. 381. *H. petersiana*, Klotzsch ex Mart. Palm. iii. 227.

Mozamb. Dist. German East Africa: Usambara; by the River Pangani in Mauia district, *Stuhlmann*, 24 (ex *Drude*). Portuguese East Africa and British Central Africa: "200 miles up the Zambesi it is common, also at the south end of Nyasa, and on the River Shire," ex *Kirk*. Mozambique and Sofala, ex *Drude*.

Also in Natal and Madagascar.

6. **H. Goetzei,** *Dammer in Engl. Jahrb.* xxviii. 354. A tree 50–65 ft. high. Stem simple. Leaves about 3 ft. by 4¼ ft.; petiole

plano-convex, slightly concave on the upper side near the base, with dark brown, usually sharply curved, spines on the margins, the lower spines as well as the petiole margins densely covered with fuscous floccose tomentum; ligule oblique, irregularly spiny toothed, acuminate; rhachis about 30 in. long, produced beyond the centre of the leaf, slightly toothed above the base; lamina cut $\frac{2}{3}$ its length into about 75 lobes, slightly floccose on the nerves near the base, with long filaments between the lobes. Male inflorescence racemose; branches bearing near their apices 2–3 cylindrical spikes $3\frac{1}{2}$–5 in. long, 5 lin. thick; bracts cylindrical, oblique, long acuminate, with floccose tomentum on the back near the apex; bracteoles widely cochleariform, truncate, pilose on the back. Calyx turbinate, membranous, 1 lin. or rather more long, 3-lobed. Corolla 3-partite; lobes ovate or obovate, acute, 1 lin. long, $\frac{3}{4}$ lin. broad. Stamens 6; filaments subulate, $\frac{1}{2}$ lin. long; anthers sagittate, dorsifixed below the centre, 1 lin. long. Female inflorescence racemose, about 27 in. long; branches 4–5, each bearing a single cylindrical spike; bracts cylindrical, oblique, acuminate or acute; bracteoles widely cochleariform, truncate. Flowers unknown. Fruit on a subcylindrical pedicel about 3 lin. long, oblique at the base, flattened and slightly impressed above, $2\frac{3}{4}$ in. long, $1\frac{3}{4}$–2 in. in diam.; endocarp woody; pericarp at the side 2 lin. thick, at the apex and base 4 lin. thick; foramen about 5 lin. in diam. Seed 16 lin. long, 11 lin. in diam.; albumen ovate, bony, enclosing an ovate cavity; embryo turbinate, near the apex of the seed.

Mozamb. Dist. German East Africa: between Khutu and Uhehe, on the eastern slope of the Vidunda Mountains, by the Ruaha River, on waste ground in moist grey soil, 1640 ft., *Goetze*, 413.

7. **H. ventricosa,** *Kirk in Journ. Linn. Soc.* ix. 235. "Known from other species by its loftier stem, swollen in the middle; ligule unilateral; fruit spherical, surrounded by a considerable quantity of farinaceous matter, and larger than that of *H. coriacea* or *H. crinita.*" —Wendl. in Bot. Zeit. 1881, 93; Engl. Pfl. Ost-Afr. C. 130; Drude in Engl. Jahrb. xxi. 110; Schweinf. in Bull. Herb. Boiss. iv. App. iii. 34; Gard. Chron. 1884, xxi. 649, fig. 126; Dinter in Gard. Chron. 1900, xxviii. 372, and in Gartenfl. 1901, 176.

Lower Guinea. Congo, ex *Johnston.* German South-west Africa: Damaraland, *Dinter!*

Mozamb. Dist. Rhodesia: Victoria Falls, on the Zambesi River, and believed to extend southwards to Lake Ngami, ex *Kirk.*

"Called Mokolwana by the Makololo," *Kirk.*

Dinter states (l.c.) that this species occurs abundantly south of Grootfontein, outside the tropic.

Imperfectly known species.

8. **H. aurantiaca,** *Dammer in Engl. Jahrb.* xxviii. 355. Fruit ovate, slightly impressed above, not oblique at the base, faintly keeled on one side, about $2\frac{2}{3}$ in. long, 2 in. in diam.

Mozamb. Dist. German East Africa: extending from Langenburg to Lake Rukwa, *Goetze.*

This is said to differ from *H. Goetzei*, Dammer, in the shape of the fruit, which has a bloom on the ripe endocarp, and the shape of the seed.

9. **H. benguellensis,** *Welw. Syn. Explic.* 40. A very elegant palm. Stem 20–25 ft. high, about 6 in. thick, straight, "cylindrical, moderately ventricose above the middle," always simple. Berries exactly spherical, shining dull brown.—Wendl. in Bot. Zeit. 1881, 92; Durand & Schinz, Conspect. Fl. Afr. v. 460; Drude in Engl. Jahrb. xxi. 110, 123; Rendle in Cat. Afr. Pl. Welw. ii. 84.

Lower Guinea. Angola: Mossamedes; plentiful in rather damp sandy places near the banks of the River Caroca, near Porto-Pinda and Cabo Negro, forming very elegant woods round the native village Caroca, *Welwitsch*, 6656! *Welwitsch*, fruit, 1053!

10. **H. compressa,** *Wendl. in Bot. Zeit.* 1881, 93. Fruit laterally compressed, about 3 in. long, $2\frac{1}{4}$–$2\frac{3}{4}$ in. in diam. Seeds laterally compressed, lenticular, $1\frac{1}{2}$ in. long, 1–$1\frac{1}{2}$ in. in diam.—Drude in Engl. Jahrb, xxi. 110.

"Central Africa:" without exact locality or collector's name.

11. **H. macrosperma,** *Wendl. in Bot. Zeit.* 1881, 92. Fruit ovate, rather obtuse, very smooth at the top, slightly swollen on the ventral side, $2\frac{3}{4}$ in. long, $2\frac{1}{3}$ in. in diam., resembling that of *H. thebaica*, but rounder, more obtuse, and of a duller colour. Seed roundish ovoid, $1\frac{3}{4}$ in. long, $1\frac{1}{2}$–$1\frac{3}{4}$ in. in diam.—Drude in Engl. Jahrb. xxi. 110.

"Central Africa:" without exact locality (probably from the Niger Region), *Baikie* (ex *Wendland*).

I find no specimen corresponding to this at Kew.

12. **H. turbinata,** *Wendl. in Bot. Zeit.* 1881, 92. Fruit orbicular from an obtuse base, very smooth at the top, much constricted half-way up, much swollen on the ventral side, faintly keeled on the dorsal, dull brown, $2\frac{1}{3}$ in. long, 2–$2\frac{1}{8}$ in. in diam. Seed truncate, inverted conic, rounded and swollen on the ventral side, $1\frac{1}{4}$ in. long, 1–$1\frac{1}{8}$ in. in diam.

"Central Africa:" without exact locality, *Livingstone* (ex *Wendland*).

I find no specimen corresponding to this at Kew.

12. **MEDEMIA,** P. G. von Württemberg; Benth. et Hook. f. Gen. Pl. iii. 882.

Fruit ellipsoid, separating from the perianth, 1-seeded, with 2 small smooth (sometimes confluent) areoles at the base; scar of stigmas opposite the areoles; pericarp thick, corky, light coloured, shiny, rugulose when dry; endocarp smooth, white. Seed oblong, attached to the side of the endocarp by a wide base; testa thick, slightly coriaceous and whitish outside, brown within; albumen horny, slightly ruminate, hollow in the centre; embryo basal.—Stem simple. Leaves flabellate, with a few filaments between the segments; petiole unarmed; ligule none. Male catkins slender, with reddish tomentose scales. Mature carpels 1–3.

A genus of 2 imperfectly known species, confined to Tropical Africa.

Seed much longer than broad	1. *M. Argun.*
Seeds nearly as broad as long	2. *M. abiadensis.*

1. **M. Argun,** *P. G. von Württemberg ex Mart. Palm.* iii. 227. Fruit ellipsoid, dull brown, 22 lin. long, 17 lin. in diam., bitter, not edible. Seed ellipsoid, 17 lin. long, 12–14 lin. in diam.—Wendl. in Bot. Zeit. 1881, 93; Drude in Engl. Jahrb. xxi. 111. *Hyphæne Argun,* Mart. Palm. iii. 227; Schweinf. Beitr. Fl. Aethiop. 291.

Nile Land. Nubia and Kordofan, between 20° and 21° N., *Kotschy,* and *Prince Paul Wilhelm of Württemberg* (ex *Martius*), *Schweinfurth!* Wady Delah, near Murat in the Great Nubian Desert, between Korosko and Aboo Hammed, *Vossiau!*

Steps have been taken by the Government to preserve the grove at Wady Delah, which was in danger of extermination by the inhabitants, who use the leaves for making matting.

2. **M. abiadensis,** *Wendl. in Bot. Zeit.* 1881, 93. Fruit ellipsoid, bright brown, 18–19 lin. long, 14–15 lin. in diam. Seeds 12–13 lin. long, 10–11 lin. in diam.—Drude in Engl. Jahrb. xxi. 111.

Nile Land. On the White Nile, *Armand.*

13. **ELÆIS,** Jacq.; Benth. et Hook. f. Gen. Pl. iii. 944.

Male flowers: Sepals linear or lanceolate, concave, imbricate. Petals smaller and thinner than the sepals, valvate. Stamens 6; filaments connate into a thick fleshy cylindrical tube below, free and reflexo-patent at the apex; anthers linear-oblong, bilobed at the base, exserted, basifixed. Rudiment of ovary minute. Female flowers much larger than the male, ovoid. Sepals ovate, imbricate at the base. Petals a little longer than the sepals, erect, convolute-imbricate, entire or split at the apex. Disk annular. Ovary ovoid or subcylindrical, 3-celled, or by abortion 1–2-celled; style thick, pyramidal; stigmas large, linear, revolute; ovule filling up the cell, micropyle subapical. Fruit ovoid or obovoid, 1–3-seeded, intruded at the base, umbilicate at the apex; stigmas terminal; pericarp spongy and oily, fibrous inside; endocarp thick, long, with 3 pores above the middle. Seed adnate just below the centre of the cell; testa thin; raphe reticulately branched; albumen cartilaginous, homogeneous, hollow; embryo opposite a pore of the endocarp.—Slender or tall, unarmed palms. Stem unbranched, erect or decumbent, annulate, clothed with old petiole-bases. Leaves many in a terminal crown, large, pinnate; petiole short, thick, spiny on the margins or unarmed, with a short open sheathing base; leaflets ensiform, acuminate, recurved at the base. Spadices interfoliaceous, short, thick; peduncle loosely clothed with acute bracts; branches dense, male terminating in a spine, female more robust; spathes 2, complete, at length breaking up into fibres; male bracts very densely imbricate, connate into cupules; male bracteoles scale-like; female bracts large, lanceolate, spinescent, overtopping the flowers; female bracteoles like the sepals.

Species 1 in Tropical Africa, 2–3 in Eastern Tropical South America.

1. **E. guineensis,** *Jacq. Stirp. Amer.* 280, *t.* 172, *ed. pict.* 136, *t.*257. Stem robust, 20–30 ft. high, 1 ft. or more in diam., annulate, and bearing the remains of old leaves. Leaves 12 or more in a terminal crown, 10–15 ft. long, erecto-patent; petiole 4 ft. long, widened at the base, plano-convex, more or less brownish lepidote, spiny on the margins; leaflets 50 or more, 1½ ft. or more long, 1½–2 in. wide, midrib distinct, secondary nerves about 6 on each side. Spadices 8 to many, male 4–6 in. long, with many branches bearing densely imbricate flowers, female peduncled with the branches congested into a globose capitulum. Male flowers: Sepals linear. Petals linear-oblong. Anthers linear, subsagittate. Rudiment of ovary minute, white. Female flowers: Sepals ovate. Petals glabrous, reddish-brown. Ovary ovoid, sometimes angular; style pyramidal, triquetrous; stigmas large, ovate-lanceolate, reflexo-patent.—Mart. Palm. ii. 62, tt. 54, 56, and in Münch. gel. Anzeig. 1838, 639, 1839, 46; R. Br. Vermischte Schrift. i. 269; Schum. & Thonn. Beskr. Guin. Pl. 439; Tuckey, River Congo, 455; Hook. Niger Fl. 13, 526; Mann & Wendl. in Trans. Linn. Soc. xxiv. 424, 439; Kirk in Journ. Linn. Soc. ix. 231; Schweinf. Beitr. Fl. Aethiop. 291; Güssfeldt & Pechuel-Loesche, Die Loango-Exped. i. 56, with fig., 208, 224, with fig.; J. Braun in Mitth. Deutsch. Schutzgeb. ii. (1889), 148; Engl. Pfl. Ost-Afr. B. 8, C. 131; Drude in Engl. Jahrb. xxi. 112; Henriques in Bolet. Soc. Brot. v. 206, 218; Durand & Schinz, Conspect. Fl. Afr. v. 462, and Études Fl. Congo, i. 274. *E. guineensis*, var. *macrosperma*, Welw. Apont. 584; Rendle in Cat. Afr. Pl. Welw. ii. 84.

Upper Guinea. Senegambia: Cape Verde, *Brunner!* Liberia: Cape Palmas, *Vogel*, 65! Lower Niger: foot of Mount Patteh, *Vogel.* Old Calabar, *Milne!* Fernando Po, *Mann!*

Nile Land. British East Africa: Bahr-el-Abiad (White Nile), *Schweinfurth.*

Lower Guinea. Island of St. Thomas, *Moller!* French Congo: a short distance south of Cape Lopez, *Johnston.* Congo, *Tuckey.* Lower Congo: from Moussouk to Kinchassa, *Dupont;* and without precise locality, *Smith*, *Dupuis*, *Laurent.* Angola: Icolo e Bengo; Quifandongo, *Welwitsch*, fruit, 1057! Bengo shore, *Welwitsch*, fruit, 1060! Barro do Bengo; plentiful in damp woods on the banks of the River Bengo at San Antonio, *Welwitsch*, 6660! Golungo Alto; banks of the River Delamboa, *Welwitsch*, 6664! and 1061 (wool from leaf)!

Mozamb. Dist. Zanzibar, *Kirk!* Pemba Island, ex *Engler;* Tanganyika, ex *Engler.* British Central Africa: Nyasaland; west shore of Lake Nyasa, near Sani Hill, *Kirk!* Fort Hill and Songue, *Whyte!*

South Central. Congo Free State: Monbuttu; near Munza (cultivated) *Schweinfurth*, 3349!

Var. *microsperma*, Welw. Apont. 584. Fruit 1⅓ in. or less long.—Rendle in Cat. Afr. Pl. Welw. ii. 84.

Lower Guinea. Angola: banks of the River Bengo, *Welwitsch*, fruit, 1058! Golungo Alto; everywhere plentiful in woods at Bango, *Welwitsch*, fruit, 1059!

Native name, *Disombo.*

This is the Oil Palm, and bears the following native names:—In Guinea, *Tæhn-Tio* (*Schumacher & Thonning*); on the Congo, *Maba*=the fruit, *Emba*=a single nut, *Cachio*=a cluster of fruit (*Tuckey*); in Angola, *Dihôho*, and the tomentum of the petiole=*Uruco* or *Urucu;* in the Island of St. Thomas, *Denden* or *Palmeira Andim.*

14. **COCOS**, Linn.; Benth. et. Hook f. Gen. Pl. iii. 945.

Male flowers asymmetrical. Sepals small, acute, erect, valvate. Petals obliquely oblong, acute, valvate. Stamens 6, included; filaments subulate; anthers linear, acute or obtuse, fixed at the bifid base, erect. Rudiment of ovary minute or absent. Female flowers much larger than the male, ovoid, perianth increasing after flowering. Sepals ovate or ovate-lanceolate, thickly coriaceous, erect, imbricate. Petals enclosed by the sepals, dilated and convolute-imbricate at the base, more or less elongated and valvate at the apex. Disk annular or obscure. Ovary ovoid or depressed globose, 3-celled, 2 often obsolete, attenuate into a short style; stigmas subulate, erect, at length recurved; ovule subbasal, ascending. Fruit ovoid or ellipsoid, terete or obscurely trigonous, rostrate, rounded or intruded at the apex, 1-seeded; style terminal; pericarp thick, fibrous; endocarp woody, fibrous, with 3 pores towards the base or at the middle. Seed the same shape as the cell; testa fuscous; raphe with reticulate branches; albumen homogeneous, hollow or solid, with radially disposed fibres; embryo opposite a pore of the endocarp.—Slender or tall palms. Stem unarmed, often clothed with the bases of old leaves. Leaves in a terminal crown, pinnate; leaflets equidistant or fascicled, 1- to many-nerved, entire or toothed at the apex. Spadices interfoliaceous, erect, at length cernuous; branches erect or cernuous; lower spathe split at the apex; upper fusiform or clavate, woody, sulcate on the back; bracts various. Flowers white or yellow, the lower female with a male on either side, the upper male.

Species about 40, one throughout the tropics, the others in Tropical and Subtropical South America.

1. **C. nucifera,** *Linn. Sp. Pl.* 1188. Stem 40–80 ft. high, 1½ ft. or more in diam., terete, annulate. Leaves 12–16 ft. long, slightly arcuate, central ones erect; petiole slightly sheathing, gibbous on the back at the base, concavo-convex; rhachis sulcate at the sides, at first with brownish tomentum, at length glabrous; leaflets almost equidistant, narrowly lanceolate, acute; midrib thick, yellowish. Spathes fusiform, acute, deeply sulcate, with caducous brownish tomentum; peduncle of spadix 1 ft. long, 1 in. in diam., slightly compressed; branches many, 1½–2 ft. long, subtriquetrous; bracts widely triangular, mucronate; bracteoles minute, triangular. Male flowers: Calyx 1 lin. or less long; lobes ovate, acute, whitish. Petals narrowly lanceolate, subacute, 1½–2 lin. wide at the centre, longitudinally striate. Stamens slightly shorter than the petals; filaments very short, subulate; anthers linear, obtuse, white. Rudiment of ovary minute, trigonous. Female flower: Sepals suborbicular, acuminate, concave. Petals enclosed in the calyx, orbicular, acuminate. Ovary depressed globose, 3-celled; stigmas subulate, connate at the base. Fruit large, 10 or more maturing on the same spadix, ovoid or subglobose trigonous; epicarp thin, glabrous, fuscous, at length pale yellow; mesocarp very

thick, spongy, and with longitudinal fibres; endocarp bony, 3–4 lin. thick, adnate to the fibres of the mesocarp, dark brown, with 3 ridges connate at the apex; pores 3, basal. Seed ovoid, hollow, when young filled with a milky fluid; albumen rather hard, white; embryo oblong, slightly attenuate below the middle.—Mart. Palm. ii. 123, tt. 62, 75, and 88, figs. 3–6, and in Münch. gel. Anzeig. 1838, 639, 1839, 45; Kunth, Enum. iii. 285; Kirk in Journ. Linn. Soc. ix. 231; Grant in Trans. Linn. Soc. xxix. 187; Henriques in Bolet. Soc. Brot. v. 206, 218; Engl. Pfl. Ost-Afr. B. 3, C. 131; Beccari in Malpighia, i. 441; J. Braun in Mitth. Deutsch. Schutzgeb. ii. (1889), 147; Schweinf. in Bull. Herb. Boiss. ii. App. ii. 52; Hook f. Fl. Brit. Ind. vi. 482; Drude in Engl. Jahrb. xxi. 112; Durand & Schinz, Études Fl. Congo, i. 274; Rendle in Cat. Afr. Pl. Welw. ii. 84.

Upper Guinea. Senegal: St. Louis, *Brunner!* Gambia and Cape Verde, *Brunner!*

Lower Guinea. Island of St. Thomas, ex *Henriques.* Lower Congo. at Boma, *Dupuis;* and at other points, *Laurent.* Angola: Loando; Ilha de Loando, *Welwitsch,* 6661!

Mozamb. Dist. Zanzibar: very abundant, ex *Speke & Grant.* German East Africa: a few on the coast, ex *Speke & Grant.* Portuguese East Africa: a few trees above Tete on the left bank of the Zambesi, ex *Kirk.*

Also in Tropical Asia and Polynesia.

The cocoa-nut. Native name in the Island of St. Thomas, *Coqueiro.*

ORDER CXLVIII. **PANDANEÆ.** (By C. H. Wright.)

Flowers unisexual. Perianth none or (in *Sararanga*) rudimentary. Male flowers: Stamens usually many, hypogynous or spicate or umbellate on the axis; filaments filiform, short or long; anthers 2-celled, dehiscing longitudinally. Female flowers: Ovary 1- to many-celled; stigmas as many as the cells of the ovary, erect or more or less adpressed to the top of the ovary, usually sessile; ovules solitary and laterally fixed, or numerous on parietal placentas. Fruit drupaceous or baccate, 1- to many-celled; mesocarp fibrous or succulent; endocarp often long. Seeds with thin testa in the drupes, crustaceous in the berries; embryo basal.—Shrubs or trees. Stem simple or branched, often supported on thick adventitious roots. Leaves narrow, often imbricate in spirals, sheathing at the base. Inflorescence spicate, capitate, or paniculate, unisexual, rarely polygamo-dioecious; flowers usually sessile and crowded; bracts spathe-like.

Genera 3; species about 220, widely spread through the Mascarene Islands, Tropical Asia, Malaya, Australia, and Polynesia, and extending outside the tropics in India and Australia.

1. **PANDANUS,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 949.

Flowers unisexual. Perianth none. Stamens many, spicate on the axis of the inflorescence, or umbellate, fascicled or racemose on the floral axis; anthers linear or oblong, basifixed, erect, sometimes apiculate

pollen often tubercled. Female flowers densely crowded. Staminodes generally absent. Carpels 1-celled, solitary or united into phalanges, flat, convex or pyramidal, obtuse, umbonate or rostrate, usually angular; stigmas reniform or horse-shoe-shaped, rarely forked; ovule solitary, broadly laterally affixed. Drupes densely congested, but scarcely connate, into globose, elliptic or ovoid groups (*syncarps*); pericarp thin, the upper part sometimes deciduous; mesocarp fibrous and sometimes also fleshy; endocarp bony, 1- to many-celled. Seed ovoid or fusiform; albumen oily; embryo basal, very small.—Trees or shrubs. Stem erect, rarely prostrate, annulate, much forked, rarely simple, bearing thick aërial roots. Leaves linear, acute, usually spiny on the margins and underside of the midrib, sessile, sheathing at the base. Male spadices spicate, female terminal, spicate, racemose or solitary, sometimes pendulous; spathes white or coloured.

Species about 150, throughout the tropics of the Old World, and extending into Northern India, Queensland and New South Wales.

Many of the species have been described from imperfect material, and are accordingly difficult to classify.

*Drupes many-celled.
- Stigma oblique or erect.
  - Cells of the drupe pyramidal or conic at the apex, separated by deep furrows.
    - Stigma 2–4 lin. wide; endocarp scarcely 5 lin. long . . . . . 1. *P. Heddei.*
    - Stigma 1 lin. wide; endocarp 14 lin. long . 2. *P. Kirkii.*
  - Cells of the drupe almost flat at the apex, scarcely separated by furrows . . . . 3. *P. platycarpus.*
- Stigma flat or scarcely ascending.
  - Drupes 6–15-celled.
    - Cells of drupe separated by furrows at the apex . . . . . 4. *P. thomensis.*
    - Cells of drupe not separated by furrows at the apex . . . . . 5. *P. Hahnii.*
  - Drupes 2–5-celled.
    - Syncarps ovate; drupes $1\frac{1}{2}$ in. long . . 6. *P. Goetzei.*
    - Syncarps oblong; drupes $\frac{1}{2}$–1 in. long . . 7. *P. Stuhlmanni.*
    - Drupes solitary, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long . . . 8. *P. rabaiensis.*

**Drupes 1- (rarely 2–3-) celled.
- Syncarps solitary.
  - Drupe shortly rostrate . . . . . 9. *P. heudelotianus.*
  - Drupe obtusely umbonate.
    - Drupe shortly pyramidal at the apex . . 10. *P. Welwitschii.*
    - Drupe nearly flat at the apex . . . 11. *P. livingstonianus.*
  - Drupe neither rostrate nor umbonate . . 12. *P. Petersii.*
- Syncarps spicate.
  - Apex of drupe minutely spiny.
    - Syncarps subtended by leaves; apex of drupes conic . . . . . 13. *P. kamerunensis.*
    - Syncarps not subtended by leaves; apex of drupes long pyramidal . . . . 14. *P. Candelabrum.*
  - Apex of drupe not spiny.
    - Free part of drupe short . . . . 15. *P. barterianus.*
    - Free part of drupe 5 lin. long . . . 16. *P. Teuszii.*

1. **P. Heddei,** *Warb. in Engl. Pflanzenr. Pandan.* 46. Drupe 19 lin. long, 14 lin. in diam., deeply sulcate at the apex; stigmas irregularly lobed, 2–2½ lin. in diam.; endocarp bony, about 4 lin. long; upper part of mesocarp consisting of white spongy pith.

Mozamb. Dist. German East Africa: on the sea-coast at Dar-es-Salaam, *Hedde*, 31.

2. **P. Kirkii,** *Rendle in Journ. Bot.* 1894, 326. Syncarps similar to those of *P. Candelabrum*, Beauv. Drupes 7–9-celled, ⅔–2½ in. long, 1½–1⅔ in. wide at their greatest diameter, obovate-cuneiform, upper portion convex and polished, bearing 7–9 slightly elevated subangular divisions, terminating in a short blunt umbo, lower portion narrow and fibrous; endocarp solid, mahogany-coloured; mesocarp densely fibrous above.—Warb. in Engl. Pflanzenr. Pandan. 46.

Mozamb. Dist. German East Africa: Mainland, opposite Zanzibar, *Kirk!*

Native name, *Rope*. A male inflorescence labelled "Zanzibar, Dr. Kirk," may belong to this species. It can be described thus:—Bracts ovate, acuminate, very finely denticulate. Stamens spicate on a thick pedicel; connective produced above into an arista.

3. **P. platycarpus,** *Warb. in Engl. Pflanzenr. Pandan.* 50. Drupes 8–9-celled, obpyramidal, ⅔ in. long, 1½–2 in. in diam., about 6-angled, almost flat, and marked with corky channels at the apex, furrows dividing the cells obscure; stigmas subascending, rarely sessile, reniform, 1 lin. in diam., more or less deeply bilobed.

Mozamb. Dist. Zanzibar, *Krause*.

4. **P. thomensis,** *Henriques in Bolet. Soc. Brot.* v. 206, *t.* E. A branched tree 26–50 ft. high. Leaves somewhat sheathing at the base, 5¼ ft. long, 3½ in. wide at the middle, acute, the whole of the margin and the back of the midrib (except in its lowest quarter) thickly armed with rather slender decurved cartilaginous spines. Male inflorescence a terminal leafy spicate panicle; spathes gradually increasing in size upwards, keeled, very sparingly spiny on the midrib, rather shorter than the spadix-branches; rhachis fleshy, compressed. Stamens irregularly umbellate; filaments rather thick, conical, more or less connate; anthers 1½ lin. long, shortly apiculate. Female inflorescence solitary, terminal, at first erect; spathes somewhat sheathing, gradually becoming smaller upwards, keeled, armed on the whole margin and from the centre of the midrib with slender more or less recurved teeth; spadix ovate, 2 in. long, 1½ in. thick; rhachis fleshy. Syncarps ovate, 8½ in. long, nearly 6 in. in diam., pendulous on a long peduncle. Drupes obconic, rather convex above, 10–14-celled, sulcate and tuberculate above, 3 in. long, 1½–2¼ in. in diam.; stigmas sessile, rather thick, irregularly radiating; endocarp placed at the centre of the drupe; mesocarp spongy and fibrous above.—Rendle in Journ. Bot. 1894, 325; Warb. in Engl. Pflanzenr. Pandan. 56.

Lower Guinea. Island of St. Thomas: lower region up to 1600 ft., *Moller*. Rolas Island, *Quintas*.

Native name, *Páo esteira*. Fruit produced in December.

5. **P. Hahnii,** *Warb. in Engl. Pflanzenr. Pandan.* 56. Drupe 6–12-celled, 2 in. long, 19–24 lin. in diam., slightly compressed, flat and scarcely sulcate at the apex, shortly pyramidal below the apex, scarcely narrowed to the broadly truncate base, 4–7 lin. broad at the flat apex; stigmas sessile, flat, reniform, 1 lin. long; endocarp thick, bony, in the centre of the drupe; mesocarp spongy and containing fibres.

"East African Islands; cultivated in Martinique, *Hahn.*"

The indefinite locality renders it doubtful whether this is a member of the Tropical African flora.

6. **P. Goetzei,** *Warb. in Engl. Jahrb.* xxviii. 350. A tree, 33–50 ft. high, much branched. Leaves 4 ft. long, $2\frac{3}{4}$ in. wide at the base, gradually acuminate, armed on the margins and midrib with scattered robust spines. Syncarps many, spirally arranged on the peduncle, almost sessile, ovate, $4–4\frac{3}{4}$ in. long, $3\frac{1}{4}–4$ in. in diam. Drupes 70–90 in each syncarp, 2–5-celled, 18 lin. long, 9–12 lin. in diam., scarcely compressed, convex at the apex, slightly ribbed, narrowly pyramidal at the base; areole at the apex flat, angular, 2–3 lin. in diam.; stigmas sessile, reniform, 1 lin. or less in diam.; endocarp bony, large, in the centre of the drupe; mesocarp woody above, scarcely spongy.—Engl. Pflanzenr. Pandan. 57.

Mozamb. Dist. German East Africa: Uhehe; Lofio River (Lasio River, by error, in the place of original publication), *Goetze*, 437.

7. **P. Stuhlmannii,** *Warb. in Engl. Pflanzenr. Pandan.* 57, *fig.* 16, L-M. A tree about 50 ft. high. Stem branched at the apex. Aërial roots adpressed to the stem. Leaves nearly 10 ft. long, $2\frac{3}{4}$ in. wide, long and very slenderly acuminate, armed on the margins and midrib with long thick spines. Syncarps many, spirally arranged on the peduncle, almost sessile, oblong, $4\frac{1}{4}–5$ in. long, $2–2\frac{3}{4}$ in. in diam. Drupes 80–100 in each syncarp, 2–5-celled, 1 in. long, 6–9 lin. in diam., scarcely compressed, convex and ribbed at the apex, narrowed to the widely pyramidal truncate base; apical areole somewhat depressed, angular, $1\frac{1}{2}–3$ lin. in diam., with prominent ribs on the margin; stigmas sessile, scarcely reniform, $\frac{1}{2}$ lin. in diam.; endocarp bony, in the centre of the drupe; mesocarp spongy and fibrous above.

Mozamb. Dist. German East Africa: Dar-es-Salaam, *Stuhlmann.*

8. **P. rabaiensis,** *Rendle in Journ. Bot.* 1894, 325. Leaf $5\frac{1}{2}$ ft. long, $2\frac{3}{4}$ in. broad, linear, gradually tapering upwards and produced into a long narrow flagellum, glaucous, coriaceous, armed on the margins and keeled midrib with ascending light-coloured spines. Male inflorescence paniculate. Stamens spicate on the ultimate branches of the panicle; filaments terete, up to $\frac{2}{3}$ lin. long; anthers linear, $2\frac{1}{2}$ lin. long, connective prolonged and sometimes recurved at the tip. Drupes solitary, 1–5- (usually 4-) celled, $1\frac{1}{4}–1\frac{1}{2}$ in. long, $\frac{3}{4}–1$ in. in diam., apical quarter or third free and rounded, obconic, 5–6-angled below; mesocarp fibrous, spongy above; endocarp thick, woody, conical above;

stigmas 1–5 surrounding or seated in a depressed central areole.—Journ. Linn. Soc. xxx. 432, t. 34, figs. 1–6; Warb. in Engl. Pflanzenr. Pandan. 61.

Nile Land. British East Africa: Kisululin, on the Rabai Hills, near Mombasa, *Taylor!*

Native name, *Mtsapu.*

9. **P. heudelotianus,** *Balf. f. in Journ. Linn. Soc.* xvii. 49. Drupe 1–3-celled, $2\frac{3}{4}$ in. long, 9 lin. in diam., the upper 9 lin. rounded conical and subrostrate, the lower part gradually narrowed and angular; stigmas sessile, horseshoe-shaped or triangular; mesocarp apparently slightly hollow.—Rendle in Journ. Bot. 1894, 325, t. 347, figs. 5–6; Warb. in Engl. Pflanzenr. Pandan. 63. *Heterostigma heudelotianum*, Gaud. Voy. Bonite, Bot. Atlas, t. 25, figs. 15–31; Walp. Ann. i. 755; Ad. Brongn. in Ann. Sc. Nat. sér. 6, i. 291; Solms-Laub. in Linnæa, xlii. 66.

Upper Guinea. Senegambia, *Heudelot.*

10. **P. Welwitschii,** *Rendle in Journ. Bot.* 1894, 324, *t.* 347, *figs.* 1–4. An erect tree, 10–20 ft. high. Stem 1 ft. in diam. at the base Branches few, short, ascending. Leaves in terminal crowns, long linear, $3\frac{3}{4}$ ft. long, 14 lin. wide at the middle, near the base abruptly contracted, gradually narrowed upwards, with large sharp upcurved spines on the margins, and similar decurved ones on the midrib. Syncarps ovate-elliptic, yellowish when ripe, 6 in. long, 3 in. in diam. Drupes 12–14 lin. long, 5–7 lin. in diam. when dry, cuneiform, rounded above, narrowed below, upper $1\frac{1}{4}$ lin. free, shortly pyramidal, with a blunt central umbo, 1–2-celled; endocarp in the centre of the drupe, thick, deep red; mesocarp spongy above, fibrous below.—Cat. Afr. Pl. Welw. ii. 84; Warb. in Engl. Pflanzenr. Pandan. 65. *P. Candelabrum?* Hook. Niger Fl. 527; Welw. Apont. 586.

Lower Guinea. Angola: Pungo Andongo, banks of the River Cuanza, near Candumba and Ilha Calemba, *Welwitsch*, 5770! and fruit, 1015!

11. **P. livingstonianus,** *Rendle in Journ. Bot.* 1894, 326. Upper leaves with upwardly curved teeth on the margins only, the lower ones on the midrib also. Syncarps ovate, 5 in. long, 3 in. in diam. Drupes 5-angled, flat and 6–7 lin. across at the top, with a central subobtuse umbo.—Warb. in Engl. Pflanzenr. Pandan. 66.

Mozamb. Dist. Portuguese East Africa: Zambesi Delta; mouth of the Luabo River, *Kirk!*

This may be (as suggested by Dr. Rendle, l.c.) the species referred to by Livingstone (The Zambesi and its Tributaries, 19), which from the plate appears to be a tree 40–50 ft. high supported for a height of 8–9 ft. by forking roots.

12. **P. Petersii,** *Warb. in Engl. Pflanzenr. Pandan.* 66, *fig.* 17 J–L. A pyramidal tree, 13–26 ft. high. Stem branched, about 8 in. in diam.; branches armed with short acute spines. Leaves about 20 in. long, 9 lin. broad, armed on the margins and midrib. Syncarps solitary, elliptical. Drupes 1–2-celled, oblanceolate, 14 lin. long, 5–7 lin. in

diam., angular and cuneate (but scarcely rostrate) at the base; free apex $1\frac{1}{2}$ lin. long, convex, pyramidal, scarcely costate or umbonate; stigma terminal, reniform, $\frac{3}{4}$–1 lin. in diam.; endocarp bony, $3\frac{1}{2}$–4 lin. long; upper 3 lin. of mesocarp somewhat hollow and fibrous.—*Freycinetia sp.*, Peters, Reise Mossamb. Bot. 510, in obs.

Mozamb. Dist. Portuguese East Africa: Mozambique; on the banks of Lucuare and Munanche Rivers, *Peters*.

13. **P. kamerunensis,** *Warb. in Engl. Pflanzenr. Pandan.* 66. A branched tree. Leaves thick, glaucous beneath, narrowly acuminate for about 9 lin., 19–28 lin. wide, with distant sharp spines on the margins and midrib; spines on the lower part of the midrib pointing downwards. Male inflorescence a compound spike; spikes cylindrical, white, 6–$13\frac{1}{2}$ in. long, 7–16 lin. in diam., densely many-flowered; peduncle 5–19 lin. long, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. in diam. Stamens 6–10, subumbellate at the apex of a narrow column $2\frac{1}{2}$–6 lin. long; filaments filiform, 2–$3\frac{1}{2}$ lin. long; anthers $\frac{1}{2}$–$\frac{3}{4}$ lin. long, linear, acute. Female inflorescence terminal, compound; peduncle $19\frac{1}{2}$ in. long. Syncarps 6, sessile, ovate-globose, 3–$4\frac{1}{2}$ in. long, $2\frac{3}{4}$–4 in. in diam., slightly trigonous, scarcely surrounded by the spathes. Drupes 150–300 in each syncarp, 1–2-celled, connate high up, 14 lin. long, 5–6 lin. in diam., free part pyramidal, 5–6 lin. long, tuberculate, acutely angled, subacute, with minutely spiny ribs at the apex; stigmas terminal, reniform, sessile, $\frac{3}{4}$ lin. in diam.; endocarp bony, situated below the centre of the drupe, 5 lin. long; mesocarp fibrous in the upper part, nearly 10 lin. long.

Upper Guinea. Cameroons, *Schran.*

Native name, *Mupupu*. Warburg suggests that *Mann*, 1861, collected at Ambas Bay, may belong to this species (see Solms-Laub. in Linnæa, xlii. 28, and Rendle in Journ. Bot. 1894, 322); also a male spike from the River Limbe in the Cameroons, *Deistel*, 108.

14. **P. Candelabrum,** *Beauv. Fl. Owar.* i. 37, *tt.* 21–22. A branched tree. Stem erect, supported in the lower part by aërial roots; lower branches horizontal, upper erect. Leaves glaucous, wide, acuminate, with sharp spines on the midrib and margins. Male spadices oblong-cylindric, white, fragrant; spathes longer than the spadices, narrowed to an acute apex, spiny on the margins and back of the midrib. Stamens about 12, subumbellate. Female spadix subovate. Spathes similar to those of the male, but much shorter. Drupes 1- (rarely 2–3-) celled; stigma flat, irregularly subcordate.—Lam. Encycl. Suppl. i. 576; Spreng. Syst. iii. 898; Kunth, Enum. iii. 96; Solms-Laub. in Linnæa, xlii. 27; Balf. f. in Journ. Linn. Soc. xvii. 43; Gurich in Mitth. Afr. Gesell. in Deutsch. v. 51; Rendle in Journ. Bot. 1894, 321; Warb. in Engl. Pflanzenr. Pandan. 67. *Tuckeya Candelabrum*, Gaud. Voy. Bonite, Bot. Atlas, t. 26, figs. 10–20.

Upper Guinea. Niger Territory: Banks of the River Formosa, near Agathon, *Beauvois*. Cameroon Mountains, *Mann*, 2!

A male inflorescence from Ambas Bay (*Mann*, 780), probably belongs to this species.

15. **P. barterianus,** *Rendle in Journ. Bot.* 1894, 324. Syncarps very broadly ovate or almost spherical, up to 5 in. long and $4\frac{1}{2}$ in. in diam. Drupes 5–7-angled and shortly pyramidal at the top, produced in the centre into a short blunt apiculus.—Warb. in Engl. Pflanzenr. Pandan. 67.

Upper Guinea. Fernando Po, *Barter*, 2!

16. **P. Teuszii,** *Warb. in Engl. Pflanzenr. Pandan.* 67. Drupe (alone known) 1–2-celled, 14-lin. long, 4–$6\frac{1}{2}$ lin. in diam., cuneate-fusiform, the basal 9 lin. gradually acuminate, the apical 5 lin. shortly pyramidal and angular, scarcely produced at the apex.

Lower Guinea. Gaboon. *Teusz.*

Imperfectly known species.

17. **P. leonensis,** *Hort. Lodd. ex Wendl. Index Palm.* 46, *name only*; *Balf. f. in Journ. Linn. Soc.* xvii. 51; *Rendle in Journ. Bot.* 1894, 327; *Warb. in Engl. Pflanzenr. Pandan.* 89.

"Guinea."

18. **P. sessilis,** *Boj. Hort. Maur.* 302, *non Wendl.*; *Balf. f. in Journ. Linn. Soc.* xvii. 61; *Rendle in Journ. Bot.* 1894, 327; *Warb. in Engl. Pflanzenr. Pandan.* 90.

Mozamb. Dist. Zanzibar and Pemba Islands, ex *Bojer.*

ORDER CXLIX. **TYPHACEÆ.** (By N. E. Brown.)

Flowers unisexual, monœcious, in dense bracteate heads or spikes. Male flowers with a perianth of 3–6 scales, or without a perianth, but irregularly intermingled with slender narrowly clavate filaments, or spathulate or cuneate scales, which are often variously toothed or lobed. Stamens with free or connate filaments and basifixed, linear, oblong or cuneate, 2-celled anthers, opening by longitudinal slits; connective sometimes produced beyond the apex of the cells; no rudiment of an ovary. Female flowers with a perianth of scales or fine hairs, sometimes accompanied by slender spathulate or clavate bracteoles. Ovary superior, 1-celled, sessile or stalked; style simple, terminal, persistent; stigma unilateral, elongate; ovule solitary, pendulous from the apex of the cell, anatropous. Fruit sessile or stalked; pericarp thin and membranous, or thick with a spongy outer layer, and a hard, woody inner layer. Seed albuminous, testa thin; embryo cylindric, axile.—Perennial aquatic or marsh herbs with creeping rhizomes. Leaves alternate, linear or strap-shaped, sheathing at the base; veins parallel. Flowers small or minute, sessile, bracteolate or ebracteolate, densely crowded into globose heads or cylindric spikes along simple or branched axes, with or without leafy bracts at their base. The male inflorescence terminal.

A small order of two genera and about 25 species, very widely dispersed.

Concerning the affinities of this family, see Celakovsky in Oesterr. Bot. Zeitschr. 1891, 117, 154, 195, 224, and 266; also Graebner in Engler, Pflanzenreich, *Typhaceæ*.

1. **TYPHA,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 955.

Flowers densely crowded into simple cylindric spikes; the male spike terminal and separated from the female spike or contiguous to it. Male flowers irregularly intermingled with variously shaped scales or slender, clavate, curved filaments. Stamens with their filaments variously connate; anthers linear, basifixed, 2-celled, connective produced beyond the cells; pollen simple or compound. Female flowers ebracteolate or mingled with slender clavate or spathulate bracteoles, and often with abortive clavate female flowers (*carpodia*) mixed with them. Perianth composed of several very fine simple or clavate hairs. Ovary superior, stalked, at least after fertilization, narrow, 1-celled, with a solitary pendulous ovule; style elongated, slender, erect; stigma linear or lanceolate. Fruit minute, stalked, ellipsoid or subcylindric, with a thin membranous pericarp. Seed subcylindric or narrowly ellipsoid, albuminous; testa thin; embryo axile.—Aquatic or marsh herbs with creeping rhizomes and erect stems. Leaves alternate, linear or strap-shaped, parallel-veined. Flowering-stem erect, simple, terminated by the dense cylindric superposed unisexual flower-spikes. Bracts none, or linear and deciduous or caducous.

Species about 18, but probably some are only varietal forms, widely distributed.

Female flowers with bracteoles (see also *T. capensis*).

- Stigma linear.
  - Bracteoles much longer than the hairs . . 1. *T. angustata.*
  - Bracteoles about as long as the hairs or but slightly exceeding them.
    - Bracteoles obovate-, obcordate-, or orbicular-spathulate . . . . . 2. *T. angustifolia.*
    - Bracteoles lanceolate-spathulate . . . 3. *T. australis.*
  - Stigma lanceolate . . . . . 4. *T. Schimperi.*

Female flowers without bracteoles; stigma lanceolate.

- Bracteoles of male flowers simple, linear, acute, whitish; pollen compound . . . . 5. *T. latifolia*.
- Bracteoles of male flowers forked or toothed, brownish; pollen simple . . . . 6. *T. capensis.*

1. **T. angustata,** *Bory & Chaub. Exped. Sc. de Morée,* iii. *pt.* 2, 338. Plant 5–9 ft. high. Leaves 2–5 lin. broad, convex on the back at the base. Male and female spikes subequal or the male longer, $\frac{1}{4}$–1 in. distant, very rarely contiguous. Male flowers with bracteoles varying from filiform to narrow lanceolate-spathulate, entire or toothed, acute, light brown; pollen simple. Female flowers bracteolate; bracteoles much longer than the hairs, lanceolate-spathulate or elliptic-spathulate, acute; stigmas linear, a little longer than the bracteoles; hairs simple.—Rohrb. in Verhandl. Bot. Ver. Brandenb. xi. 87–89, incl. vars. *leptocarpa,* Rohrb. & *æthiopica,* Rohrb.; Kronfeld in Ver-

handl. Zool.-Bot. Gesell. Wien, 1889, 159–161, t. 4, fig. 6, & t. 5, fig. 1; Schweinfurth. in Bull. Herb. Boiss. ii. Append. ii. 92; Durand & Schinz, Conspect. Fl. Afr. v. 470; Graebner in Engl. Pflanzenr. Typhaceæ, 14. *T. œthiopica*, Kronfeld, l.c. 162. *T. angustifolia*, A. Rich. Tent. Fl. Abyss. ii. 350 partly; Schweinf. Pl. Nilot. 37; and in Bull. Herb. Boiss. ii. Append ii. 7; not of Linn.

Nile Land. Nubia, Kordofan and Sennar, *Schweinfurth* (ex *Rohrbach*); Bahr-el-Abiad, *Hartmann* (ex *Rohrbach*). Eritrea: Halibaret, east of Anseba, 4800 ft., *Schweinfurth*, 135; Ferfer, 3000 ft., *Schweinfurth*, 136; and Saganeiti, 7000 ft., *Schweinfurth*, 885, (ex *Schweinfurth*). Abyssinia: Tigre; streams near Jelajeranne, *Schimper*, 1563! Samen, *Schimper*, 1190 (ex *Rohrbach*); and without precise locality, *Quartin-Dillon & Petit* (ex *Rohrbach*).

Also in South-Western Europe, North Africa, the Orient, and India.

2. **T. angustifolia,** *Linn. Sp. Pl. ed.* 1, 971. Plant growing to 5 or 6 ft. high. Leaves $2\frac{1}{2}$–$4\frac{1}{2}$ lin. broad, linear, obtuse, convex on the back at the base. Male spike usually longer than the female, 5–10 in. long, $\frac{1}{4}$–$1\frac{1}{2}$ in. distant. Male flowers with spathulate-lanceolate entire or forked acute bracteoles; pollen simple. Female flowers bracteolate; bracteoles rhomboid-, obcordate-, obovate- or orbicular-spathulate, about as long as the hairs; stigmas linear, longer than the bracteoles; hairs simple.—Rohrb. in Verhandl. Bot. Ver. Brandenb. xi. 81, fig. 3; Kronfeld in Verhandl. Zool.-Bot. Gesell. Wien, 1889, 150, t. 5, fig. 2; Reichb. Ic. Fl. Germ. ix. 2, t. 321, fig. 745; Durand & Schinz, Conspect. Fl. Afr. v. 470, partly; Engl. Pfl. Ost-Afr., C. 93; Gregory, Great Rift Valley, 398; Graebner in Engl. Pflanzenr. Typhaceæ, 11.

Nile Land. Nubia: between Suakin and Berber, *Schweinfurth*, ser. iii. 219! British East Africa: cliffs above Lake Losuguta, *Gregory*.

Also in Europe, the Orient, and North America.

3. **T. australis,** *Schumach. & Thonn. Beskr. Guin. Pl.* 401. Plant attaining 5–6 ft. in height. Leaves 3–6 lin. broad, linear or strap-shaped, obtuse, convex on the back at the base. Male and female spikes subequal, $4\frac{1}{2}$–12 in. long, contiguous or $\frac{1}{2}$–1 in. distant. Male flowers with variously shaped bracteoles; nearly filiform, very narrowly spathulate-lanceolate and entire, or broader and 2–3-forked, or very broadly spathulate and variously lobed and toothed; pollen simple. Female flowers bracteolate; bracteoles lanceolate-spathulate or rarely fusiform-clavate, acute or acuminate, about as long as or slightly longer than the hairs; stigmas linear, longer than the bracteoles; hairs simple.—Schumach. & Thonn. in Danske Vidensk. Selsk. Afhandl. 1829, 175; Kronfeld in Verhandl. Zool.-Bot. Gesell. Wien, 1889, 156, t. 5, fig. 4 (excluding syn. *T. æquinoctialis*, Welw.); Schinz in Bull. Herb. Boiss. iv. Append. iii. 9; and vii. 888; N. E. Br. in Dyer, Fl. Cap. vii. 31; Graebner in Engl. Pflanzenr. Typhaceæ, 13. *T. angustifolia*, Hook. Niger Fl. 527; Durand & Schinz, Conspect. Fl. Afr. v. 470, partly, not of Linn. *T. angustifolia*, var. *australis*, Rohrb. in Verhandl.

Bot. Ver. Brandenb. xi. 83. *T. macranthelia*, Webb & Berth. Iles Canar. Phyt. iii. 291, t. 218.

Upper Guinea. Gold Coast: Quitta, *Thonning*. Lagos: Kradu Lagoon, *Barter*, 3240! Guinea, *Schumacher* (ex *Kronfeld*).

Nile Land. Eritrea: Goura, 6500 ft., *Schweinfurth & Riva*, 922! British East Africa: near Mombasa, *Hildebrandt*, 1229B!

Lower Guinea. German South-West Africa: Hereroland; Kuisib River, at Scheppmansdorf, *Belck*, 19 (ex *Schinz*).

Mozamb. Dist. British Central Africa: Nyasaland; Manganja Hills, abundant by Lake Shirwa, *Meller!* Islands in the River Shire, below Katungo, *Scott!*

Also in South Africa.

4. **T. Schimperi,** *Rohrb. in Verhandl. Bot. Ver. Brandenb.* xi. 95. Plant several ft. high. Leaves $\frac{3}{4}$–1 in. broad, narrowed to 5–7 lin. broad at the base, where they are convex on the back. Male spike up to 18 in. long, longer than the female and distant from it. Male flowers with linear, obtuse bracteoles; pollen compound, in tetrads. Female flowers bracteolate; bracteoles narrowly spathulate, much longer than the hairs; stigma spathulate-lanceolate, longer than the bracteoles; hairs simple.—Kronfeld in Verhandl. Zool.-Bot. Gesell. Wien, 1889, 166. *T. elephantina*, Schimp. ex Rohrb. in Verhandl. Bot. Ver. Brandenb. xi. 95, not of Roxb. *T. elephantina*, Roxb., var. *Schimperi*, Graebner in Engl. Pflanzenr. Typhaceæ, 11.

Nile Land. Abyssinia: near Jaja, *Schimper*, 1479.

I have not seen this species; it is said to differ from *T. elephantina*, Roxb., by the leaves being convex on the back at the base, instead of obtusely keeled.

5. **T. latifolia,** *Linn. Sp. Pl. ed.* 1, 971. Plant attaining a height of 5–8 ft. Leaves $\frac{1}{2}$–1 in. broad, strap-shaped, obtuse, convex on the back at the base. Male and female spikes 4–12 in. long, subequal or the female longer, contiguous, very rarely shortly separated. Male flowers with linear, acute bracteoles, not forked, whitish; pollen compound, in tetrads. Female flowers without bracteoles; stigmas lanceolate or spathulate-lanceolate, longer than the simple hairs.—Kunth, Enum. Pl. iii. 90; Rohrbach in Verhandl. Bot. Ver. Brandenb. xi. 75, fig. 1; English Bot. ed. 3, 2, t. 1385; Reichb. Ic. Fl. Germ. ix. 2, t. 323; Kronfeld in Verhandl. Zool.-Bot. Gesell. Wien, 1889, 176, t. 5, fig. 11; Durand & Schinz, Consp. Fl. Afr. v. 470; Engl. Pfl. Ost-Afr. C. 93; Graebner in Engl. Pflanzenr. Typhaceæ, 8. *T. angustifolia*, A. Rich. Tent. Fl. Abyss. ii. 350, partly, ex Rohrbach.

Nile Land. Abyssinia: Shire, *Quartin-Dillon & Petit* (ex *Rohrbach*).

Mozamb. Dist. German East Africa: Usambara, ex *Engler*.

I have not seen a specimen of this species from Tropical Africa; it is widely distributed in Europe, Asia, and North America.

6. **T. capensis,** *Rohrb. in Verhandl. Bot. Ver. Brandenb.* xi. 96. Plant attaining a height of 6–7 ft., glabrous. Leaves 2–7 lin. broad, linear or strap-shaped, obtusely pointed, convex on the back at the base Male and female spikes subequal or the female longer, $3\frac{3}{4}$–7

in. long, contiguous or shortly separated. Male flowers with brownish linear-spathulate or cuneate-spathulate, entire or variously lobed or toothed, acute bracteoles; pollen simple. Female flowers usually ebracteolate, occasionally with a few narrow spathulate-lanceolate colourless bracteoles mingled with them; stigmas spathulate-lanceolate, longer than the simple hairs.—Kronfeld in Verhandl. Zool.-Bot. Gesell. Wien, 1889, 180, t. 5, fig. 13; N. E. Br. in Dyer, Fl. Cap. vii. 32; Rendle in Cat. Afr. Pl. Welw. ii. 85; Graebner in Engl. Pflanzenr. Typhaceæ, 10. *T. latifolia*, Krauss in Flora, 1845, 343, not of Linn. *T. æquinoctialis*, Welw. ex Kronfeld in Verhandl. Zool.-Bot. Gesell. Wien, 1889, 156.

Lower Guinea. Loango: Chinchocho, *Soyaux*, 87! Angola: Golungo Alto; in marshes on the right of the Coango and Quiapose rivulets, *Welwitsch*, 241! Huilla; by river banks near Lopollo, and in pools on the banks of the stream Quipumpunhine, near Humpata, *Welwitsch*, 243 (ex *Rendle*); Mossamedes; in deep pools near Mossamedes (Aguadas), and in lakes at the mouth of the River Giraul, *Welwitsch*, 244!

Mozamb. Dist. German East Africa: Dar-es-Salaam, *Hildebrandt*, 1229! Portuguese East Africa: by the River Refubwe (Revugwe), near Tete, *Kirk!*

Also in South Africa.

This may be distinguished from *T. latifolia*, Linn., by the bracteoles of the male inflorescence being brownish and usually more or less lobed or forked at the top, and by the simple pollen. A specimen without flower, collected by pools near the sea, and near San Pedro, in the district of Loanda, Angola (*Welwitsch*, 242), is doubtfully referred to this species by Rendle in Cat. Afr. Pl. Welw. ii. 85. Kronfeld and Graebner have erroneously referred *T. æquinoctialis*, Welw. to *T. australis*, Schum. & Thonn., from which the absence of bracts to the female flowers at once distinguishes it.

ORDER CL. **AROIDEÆ.** (By N. E. Brown.)

Flowers unisexual or hermaphrodite, with or without a perianth, sessile on a spadix enclosed within, adnate to, or subtended by a green or coloured spathe. Spadix monœcious or entirely covered with hermaphrodite flowers, or rarely unisexual, with or without a terminal barren appendix, and with or without neuter organs on various parts of it. Perianth, when present, of 3–9 free or connate segments. Stamens 4–6, rarely more or fewer (when the male flowers have no perianth, the stamens are crowded together, so that the number belonging to each flower is often indeterminable), free or connate; filaments none, or broad and flat, or rarely filiform or clavate; anthers opening by terminal pores, or by short or long longitudinal slits; pollen often emitted in sausage-like strings. Ovary sometimes surrounded by staminodes, superior, or very rarely inferior, with or without a style; 1- to many-celled, with axile, parietal, basal or apical placentation; stigma entire or lobed; ovules 1 to many in a cell, orthotropous, campylotropous or anatropous. Fruit a 1 to many-seeded berry. Seeds albuminous or exalbuminous.—Erect, creeping or climbing herbs or shrubs, simple or branched. Rootstock often tuberous or thick and fleshy.

Stem rarely woody. Leaves alternate, radical or cauline, usually with sheathing petioles, net- or parallel-veined. Spathe open to the base or the lower part convolute or tubular, wholly deciduous or persistent, or only the tubular part persistent.

A large order, of about 100 genera, and about 1000 species, chiefly concentrated in the tropics of both hemispheres, very few in temperate regions.

*Flowers unisexual.

†Perianth none.

Female part of spadix adnate to the back of the spathe; flowers unilateral.

Female flower or ovary solitary; a floating herb — 1. PISTIA.

Female flowers or ovaries 3–12 . . . — 17. CALLOPSIS.

Female part of spadix free from the spathe, bearing flowers all round.

‡Spadix with a terminal appendix destitute of flowers, but sometimes covered with filiform processes or hairs; herbs with a tuberous rootstock.

Leaves and flowers produced together (see also *Amorphophallus angolensis*).

Leaves peltate, cordate- or sagittate-ovate; spadix monœcious; ovary 1-celled; ovules numerous on parietal placentas . . . — 8. COLOCASIA.

Leaves 3-partite, pedate, or with several leaflets radiating from the apex of the petiole; spadix often unisexual; ovary 1-celled; ovules basal, orthotropous . . . — 3. ARISÆMA.

Leaves and flowers produced at different times.

Leaves pedate; margins of the spathe connate into a tube below; spadix with neuter organs above the female flowers . . . . — 2. SAUROMATUM.

Leaves 3-branched at the apex of the petiole; branches dichotomously divided, pinnatipartite; spathe convolute below, except in *A. Elliotii*; spadix without neuter organs . — 4. AMORPHOPHALLUS.

‡‡Spadix without a terminal appendix.

§Herbs with a tuberous rootstock or a thick fleshy rhizome; no distinct stem. (See also *Anubias*, which has a creeping rhizome.)

Spadix with barren organs (staminodes) on the apical part.

Ovary 2-celled; ovule solitary in each cell; anthers connate in pairs . — 5. ZYGANTHERA.

Ovary 1-celled; anthers connate in groups of 4–8 . . . . — 10. TYPHONODORUM.

Spadix with barren organs (staminodes?) between the ovaries and fertile anthers, none on the apical part; ovary

2–4-celled; ovules axile, numerous in each cell . . . . . 9. CALADIUM.
Spadix covered with fertile flowers to the apex, without barren organs (or with a few staminodes mixed with the ovaries in *Richardia*).
Ovule solitary in each cell, basal or subbasal.
Leaves much divided.
Spathe convolute, obliquely truncate at the top; ovary 2-celled; stamens free . . 6. PSEUDOHYDROSME.
Spathe boat-shaped, shortly convolute at the base, acute; ovary 1-celled; stamens free 7. ANCHOMANES.
Leaves sagittate; spathes expanded, decurrent on the peduncle at the base; ovary 1-celled . 12. NEPHTHYTIS.
Ovules 2–4 in each cell, axile; spathe obliquely funnel-shaped, with a subulate point; leaves sagittate, hastate, or entire . . . 11. RICHARDIA.
§§Stems climbing or creeping and rooting or erect.
Ovary 1–2-celled; ovule solitary in each cell; anthers free.
Leaves subpinnatipartite or perforated 13. RHEKTOPHYLLUM.
Leaves entire, not perforated, acute or obtuse at the base . . . 14. CULCASIA.
Leaves cordate, sagittate or hastate at the base, or 3-lobed, not perforated. 15. CERCESTIS.
Ovary 2–3-celled; ovules numerous in each cell; anthers of each male flower connate into an angular truncate body 16. ANUBIAS.
††Perianth present; female part of the spadix free from the spathe, bearing flowers all round it.
Spathe-margins connate into a tube below or nearly to the top; perianth in one piece, urceolate or cupular; petiole not thickened near the middle . . . . . 18. STYLOCHITON.
Spathe convolute below; perianth-segments free; petiole with a thickened joint near the middle.
Stamens with free filaments; leaves several, evergreen, pinnate . . . . 19. ZAMIOCULCAS.
Stamens with connate filaments; leaf solitary, annual, 1–3-pinnate . . . . 20. GONATOPUS.
**Flowers hermaphrodite.
Leaves all radical, sagittate or hastate; petiole prickly; spathe persistent during flowering; perianth-segments 4–6 . . . . 21. CYRTOSPERMA.
Leaves spaced along a climbing stem, not sagittate or hastate; petiole smooth; spathe falling quickly after expansion; perianth none . . . . . 22. RHAPHIDOPHORA.

1. **PISTIA,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 964.

Spathe small, tubular below; limb open, oblique, constricted on each side at its base. Spadix shorter than the spathe, monœcious; female part adnate to the back of the spathe; male part free, stipitate, having two neuter organs at its base, the upper cup-shaped or frill-like, the lower suborbicular or subreniform in outline, with the sides bent inwards or downwards. Flowers unisexual. Perianth none. Female inflorescence of a single ovary, apparently arising from the back of the spathe, very oblique, 1-celled; style obliquely erect from the top of the ovary; stigma capitate; ovules numerous, basal, orthotropous. Male inflorescence of a stipitate whorl of 3–8 flowers; each flower composed of 2 connate 2-celled anthers, opening by short slits. Fruit ellipsoid, with a thin pericarp, many-seeded. Seeds cylindric-oblong, truncate at each end, depressed at the apex, with an operculum closing the micropyle, rugulose; testa thick, composed of a brown membranous outer and inner skin, and a thick white cellular layer between them; embryo minute, apical.—A floating, stoloniferous, stemless herb, with a tuft of fibrous roots. Leaves in a rosette; veins flabellate, raised beneath. Spathes axillary, with very short peduncles.

A genus of one species, very variable in the form of its leaves, found throughout the tropical and sub-tropical regions of the globe, in still, fresh water.

1. **P. Stratiotes,** *Linn. Sp. Pl. ed.* 1, 963. Leaves sessile in a rosette, 1–5 in. long, 1–2 in. broad, cuneate-oblong or cuneate-obovate, notched or entire at the broadly rounded or subtruncate apex, more or less pubescent on both surfaces, tomentose with long matted hairs at the base. Spathe 3½–5 lin. long, more or less hairy or villous outside, glabrous within, pale green; limb ovate, subobtuse, with a broad white ciliolate margin. Ovary pale green, pubescent. Neuter organs frill-like, pale green. Anthers dirty white.—Dict. Sciences Nat. ix. 537, xli. 154, Pl. ii. tt. 7–8; Hook. Niger Fl. 527; Bot. Mag. t. 4564; Flore des Serres, vi. 289, t. 625; Thompson in Speke, Nile, Append. 651; Oliver in Trans. Linn. Soc. xxix. 159; Engl. in DC. Monogr. Phan. ii. 634; Pflanzenfam. ii. iii. 152, fig. 100; Jahrb. vii. 332; and Pfl. Ost-Afr. C., 132; Baill. Hist. des Pl. xiii. 449, fig. 323–327; N. E. Br. in Dyer, Fl. Cap. vii. 33; Durand & Schinz, Conspect. Fl. Afr. v. 483, 484, and Études Fl. Congo, i. 277; De Wild. & Durand, Contrib. Fl. Congo, i. fasc. 2, 65; Hoffm. in Bolet. Scc. Brot. iv. 233; Rendle in Cat. Afr. Pl. Welw. ii. 85; Cummins in Kew Bulletin, 1898, 80. *P. africana,* Presl, Epimel. Bot. 240; Klotzsch in Abhandl. Akad. Wissenschaft. Berlin, 1853, 355 (reprint 27); Schweinf. Beitr. Fl. Aethiop. 193. *P. natalensis,* Klotsch, & *P. æthiopica,* Fenzl ex Klotzsch in Abhandl. Akad. Wissenschaft. Berlin, 1853, 353 (reprint 26). *P. natalensis,* Garcke in Peters, Reise Mossamb. Bot. 509. *P. Leprieuri,* Blume, Rumphia, i. 79; Klotzsch in Abhandl. Akad. Wissenschaft. Berlin, 1853, 354 (reprint 26).

Upper Guinea. Senegal, *Lelievre, Heudelot* (ex *Engler*). Ashanti: Assin-Yan-Coomassie, *Cummins!* Niger Territory: Nupe; Lom, *Barter,* 176! River

Niger, *Barter*, 3244 (ex *Engler*). Lower Niger: Ibu (Abo), *Vogel*, 12! Cross River, *Holland*, 233! Cameroons: Mungo, *Bucholz!* Bipinde, *Zenker*, 1167! and without precise locality, *Preuss*, 1361! Lake Chad, *Vogel*, 41!

Nile Land. Upper Sennar: near Fazokl, *Kotschy*, 461! Æthiopia, *Kotschy*, 196! White Nile, *Schweinfurth*, 1061! 1100! 1111! *Petherick! Speke & Grant!* British East Africa: Taita; Ndara Mountain, *Hildebrandt*, 2356!

Lower Guinea. Lower Congo, *Hens, Demeuse* (ex *Durand & Schinz*); Stanley Pool, *Luja*, (ex *Wildeman & Durand*). Angola; Icolo e Bengo; in lakes around Prata, *Welwitsch*, 214! Pungo Andongo; by the sides of the River Cuige, near Quibinda, *Welwitsch*, 215! Ambriz; stagnant places around Quizemba, *Welwitsch*, 216! Golungo Alto; near Sange, in stagnant places by the banks of the River Quiapoze, *Welwitsch*, 217! and Mossamedes; in lakes at the mouth of the River Giraul, *Welwitsch*, 218! pools at Pedra Grande, *Newton* (ex *Hoffmann*); mouth of the Kuango River, *Descamps* (ex *Engler*).

Mozamb. Dist. Portuguese East Africa: Zambesi Delta; in the River Luabo, *Kirk!* east coast of Lake Nyasa, *Johnson*, 146A! British Central Africa: Nyasaland; Blantyre, *Descamps* (ex *Dewevre*).

South Central. Congo Free State; Kasai River, *Luja* (ex *Wildeman & Durand*).

Widely distributed in the warmer regions of both hemispheres.

2. **SAUROMATUM,** Schott; Benth. et Hook. f. Gen. Pl. iii. 966.

Spathe very long, its margins connate below, forming a cylindric tube, inflated at the base, withering in fruit; limb 3–4 times as long as the tube, narrow, tapering, usually more or less convolute towards the apex. Spadix free, shorter than the spathe, monœcious, sessile, bearing the male and female flowers in short cylindric very distant spikes and several spreading clavate or filiform neuter organs above the female spike, terminated by a very long terete appendix. Perianth none. Anthers densely crowded, sessile, compressed, opening by apical pores. Ovaries densely crowded, ovoid, 1-celled; stigma small, subsessile; ovules 2–4, erect from a basal placenta, orthotropous. Berries numerous, in a globose head, obovoid, somewhat flattened at the apex. Seed spheroid or flattened on one side, apiculate; testa thin; albumen copious; embryo axile.—Herbs with a depressed-globose rootstock, flowering before the leaves appear. Leaf solitary, long-petioled, pedatisect. Peduncle short, not rising much above the surface of the ground. Spathe spotted and often bordered with dark brownish-purple.

Species 3 or 4, or perhaps all forms of one species. One in India, one in Sumatra, and the following.

Neuter organs terete or slightly clavate . . .	1. *S. nubicum.*
Neuter organs filiform	2. *S. angolense.*

1. **S. nubicum,** *Schott, Syn. Aroid.* 25. Leaf solitary, pedatisect; petiole 1–1½ ft. long, glabrous; segments of the blade 7, broadly oblanceolate, acuminate, narrowed towards the base where they are more or less connected; middle segment about 9 in. long, 3½–4 in. broad, the

others gradually smaller, entire, glabrous; veins rather numerous, forming an acute angle with the midrib, nearly straight, and subparallel, all uniting in a vein about 2–2½ lines within the margin, slightly prominent beneath. Peduncle 2–6 in. long. Spathe-tube about 2 in. long, blackish-purple at the base within; limb 8–10 in. long, elongated-lanceolate, tapering to an acute point, spotted with dark purple. Spadix 8–9 in. long, sessile; male and female spikes each 3–4 lin. long, dense, cylindrical, distant from one another about 1½ in.; neuter organs 1¾ lin. long, slightly clavate or subterete, spreading, placed just above the female spike; appendix 7–8 in. long, terete, purple-brown or dark fuscous.—Schott, Prod. Aroid. 72. *S. abyssinicum*, Engl. in DC. Monogr. Phan. ii. 569, Hochgebirgsfl. Trop. Afr. 153, and Pfl. Ost-Afr. C., 132; Martelli, Fl. Bogos. 88; Schweinfurth in Bull. Herb. Boiss. ii., Append. ii. 52; Penzig in Atti Congr. Bot. Genova, 1892, 363; Durand & Schinz, Conspect. Fl. Afr. v. 480, excl. syn.; not of Schott. *Arum abyssinicum*, Schweinf. Beitr. Fl. Aethiop. 193.

Nile Land. Eritrea: Baresa Valley, below Ginda, 1900 ft., *Schweinfurth*, 218 (ex *Schweinfurth*); Donkolla Heights near Ginda, 3200 ft., *Schweinfurth*, 187 (ex *Schweinfurth*); Ginda Valley, 3000 ft., *Schweinfurth*, 489! Mogod Valley, 4500 ft., *Schweinfurth & Riva*, 1570! Mount Sabber, *Penzig*; Keren, 1600 ft., *Beccari*, 169. Upper Sennar: Fazokl, *Cienkowsky*.

Mozamb. Dist. German East Africa: Kilimanjaro, at Marangu, 4500 ft., ex *Engler*. British Central Africa: Nyasaland, cultivated specimen, *Buchanan!*

S. (?) *abyssinicum*, Schott, was founded upon *Arum abyssinicum*, A. Rich. (Tent. Fl. Abyss. ii. 352), but neither Schott nor Engler appears to have seen it. From the description given by A. Richard, however, it cannot belong to the genus *Sauromatum*, and I have little doubt that it is a species of *Amorphophallus*, to which genus I have referred it.

The plant above described is a true *Sauromatum*, and is scarcely distinguishable from the Indian *S. guttatum*, Schott; the only difference appears to be that the neuter organs are rather shorter, and very much less clavate, being very slightly thickened at the tips. My description is chiefly based upon a cultivated specimen, grown from a tuber sent from Nyasaland by Mr. J. Buchanan to Mr. J. O'Brien, of Harrow, which quite agrees with other specimens at Kew from Eritrea, so far as they go. Engler does not describe the neuter organs, but they are very evident in the specimens at Kew.

2. **S. angolense,** *N. E. Br.* Tuber hemispherical. Leaf pedatisect; petiole 2 ft. or more long; segments of the blade 7–11, elliptic-lanceolate or oblanceolate, acuminate, narrowed towards the base and more or less confluent there, intramarginal vein 3–6 lin. distant from the margin. Spathe? Spadix mutilated (*Welwitsch*); appendix elongated, gradually attenuate; neuter organs rather long, filiform.—*S.? nubicum*, Schott in Journ. Bot. 1865, 34; Engl. in DC. Monogr. Phanerog. ii. 570; Durand & Schinz, Conspect. Fl. Afr. v. 480; Rendle in Cat. Afr. Pl. Welw. ii. 86, not of Schott, Syn. Aroid, or Prod. Aroid.

Lower Guinea. Angola: Ambaca; in fissures of the rocks of the large cavern called Puri Cacarambola, 3000 ft., rare, *Welwitsch*, 229!

I have only seen a leaf of this, which is very like that of *S. nubicum*, Schott, but

has the intramarginal vein more distant from the margin, and if the neuter organs are filiform, as described by Schott, it can scarcely be *S. nubicum*, and upon that ground, and by reason of its different geographical area, I venture to separate it.

3. **ARISÆMA,** Mart.; Benth. et Hook. f. Gen. Pl. iii. 965.

Spathe deciduous or decaying in fruit; tube convolute, sometimes having reflexed margins at the mouth; limb expanded or hooded. Spadix unisexual or bisexual, free, sessile or stipitate, shorter or longer than the spathe, bearing flowers at the base only or for $\frac{1}{2}$–$\frac{2}{3}$ of its length, and sometimes a few subulate neuter organs above the flowers, ending in a short or long appendix, which is smooth, somewhat echinate, or loosely covered with hair-like processes. Flowers unisexual. Perianth none. Male flowers usually scattered, 2–4-androus; filaments connate; anthers 2-celled, opening by pores or slits, or the cells confluent and opening by one marginal slit. Female flowers densely crowded in a cylindric or conical spike. Ovary ovoid or subglobose, 1-celled; style short or none; stigma simple; ovules 1–10, orthotropous, erect; placenta basal, cushion-like. Fruit a berry, obovoid or subglobose, 1- to few- seeded. Seed subglobose, ovoid, or angular; testa rather thick, crustaceous; albumen copious; embryo axile.—Herbs with a tuberous rootstock. Leaves solitary or 2–4 to a plant, trifoliate, pedate, or with several leaflets in a whorl; petioles long, sheathing. Peduncle solitary, shorter or longer than the leaves.

Species about 60, chiefly natives of India, extending into the Malay Archipelago, China, Japan, and North America.

Leaflets entire	1. *A. ruwenzoricum.*
Leaflets sharply serrulate, teeth directed towards the apex	2. *A. schimperianum.*
Leaflets minutely erose denticulate, teeth mostly directed outwards	3. *A. enneaphyllum.*

1. **A. ruwenzoricum,** *N. E. Br.* Peduncle 9 in. long in the specimen seen, glabrous. Spathe-tube 4 in. long, subcylindric; limb 6 in. long, lanceolate, tapering into a long subulate tail, probably curving over the mouth of the tube. Spadix unisexual, male only seen, subsessile, $4\frac{1}{2}$ in. long, shortly exserted; male flowers loosely scattered, 3–4-androus; appendix stout, cylindric, obtuse, slightly thickened at its base, smooth.

Nile Land. British East Africa: Ruwenzori; Toru district, at Kivata, in forest, 7000–8000 ft., *Scott-Elliot*, 7773!

With the inflorescence are some unattached leaves; one of them with 5 leaflets pedately arranged, $5\frac{1}{2}$–$6\frac{3}{4}$ in. long, $1\frac{1}{2}$–$2\frac{1}{2}$ in. broad; the others with 6–7 distinctly radiating leaflets, 8–9 in. long, $2\frac{1}{4}$–$2\frac{3}{4}$ in. broad. The leaflets of both leaves are very similar in general appearance, sessile, lanceolate, or elliptic-lanceolate, acuminate to a fine point, and tapering to an acute base, with entire margins. Both leaves may possibly belong to the inflorescence, but more complete material is needed to decide, as I have never seen a species of *Arisæma*, having both radiating and pedately arranged leaflets; such a difference has hitherto been considered of sectional value.

2. **A. schimperianum,** *Schott in Bonpl.* 1859, 27. Leaves 2 to a plant; petioles long, sheathing; leaflets 7–12, radiating, sessile,

4½–8½ in. long, ¾–1½ in. broad, tapering to a long acuminate apex, and to an acute base, margins distinctly and acutely serrulate, with the teeth directed towards the apex, glabrous on both sides. Peduncle longer than the petioles, glabrous. Spathe 5–7 in. long; tube subcylindric; limb about twice as long as the tube, oblong-lanceolate, tapering into a linear-subulate tail. Spadix unisexual, a little longer than the tube, flowers densely crowded; appendix stout, straight, cylindric, obtuse, slightly thickened at its base, slightly tapering upwards, smooth.—Schott, Prod. Aroid. 47; Engl. in DC. Monogr. Phan. ii. 553, Pflanzenfam. ii. iii. 151, and Hochgebirgsfl. Trop. Afr. 154; Durand & Schinz, Conspect. Fl. Afr. v. 479.

Nile Land. Abyssinia: Samen; near Enjedcap, *Schimper*, 1125, partly! Begemeder; Gafat, 8200 ft., *Schimper*, 1197!

This species was distributed as *A. enneaphyllum*, Hochst., but is easily distinguished by its sharply serrulate leaves, with the teeth all directed towards the apex; in *A. enneaphyllum* the teeth are more minute, irregular, and more or less directed outwards.

3. **A. enneaphyllum,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 352. Leaves 2–3 to a plant; petioles long, sheathing; leaflets 5–9, radiating, sessile, 2–6 in. long, 1–2 in. broad, lanceolate or elliptic-lanceolate, acuminate, cuneate-acute at the base, minutely erose-denticulate on the margins, glabrous on both sides. Peduncle longer than the petioles, glabrous. Spathe 3½–6 in. long; tube cylindric or subcampanulate, rather more than half as long as the ovate, acuminate limb. Spadix 1¼–2¼ in. long, scarcely longer than the tube of the spathe, unisexual, usually stipitate; flowers densely crowded; appendix moderately stout, straight, cylindric, slightly tapering at the base (always?), smooth.—Schott, Syn. Aroid. 28, and Prod. Aroid. 46; Engl. in DC. Monogr. Phan. ii. 553, and Hochgebirgsfl. Trop. Afr. 153; Durand & Schinz, Conspect. Fl. Afr. v. 479.

Nile Land. Abyssinia: Samen; near Enjedcap, *Schimper*, 1125, partly! and without precise locality, *Schimper*, 580!

4. **AMORPHOPHALLUS,** Blume; Benth. et Hook. f. Gen. Pl. iii. 970.

Spathe convolute or very rarely connate into a tube below, persistent, withering. Spadix free, monœcious, with a terminal appendage: male and female parts usually contiguous, rarely distant; neuter organs none. Perianth none. Ovaries in 2 to many series, usually crowded on a cylindric spike, 1–4-celled, with or without a style; stigma entire or 2–4-lobed. Ovules solitary in each cell, basal, anatropous. Anthers sessile or subsessile, densely crowded or rarely scattered on a cylindric or obconic spike; cells contiguous, opening by 2–4 apical pores. Berries subglobose or ellipsoid. Seed ellipsoid or plano-convex, albuminous; testa thin; embryo seated at the base of the copious albumen and exterior to it.—Perennial herbs. Rootstock a tuber. Leaf solitary, not produced at the time of flowering; petiole tall, erect, 3-branched at the apex; branches 1–3 times dichotomously divided, pinnatipartite;

leaflets unequal, the terminal largest, entire, decurrent. Peduncle short or tall. Spathe variable in form; tube campanulate or funnel-shaped, rarely subcylindric; limb short and frill-like, or produced and ovate, expanded, concave or hood-like. Spadix longer or shorter than the spathe; flowering part not exceeding the tube of the spathe; appendix subglobose, ovoid, cylindric, fusiform or tail-like, smooth, rugose, or rarely hairy.

Species about 50, confined to the tropics of the Old World.

I cannot separate *Hydrosme* as a genus from *Amorphophallus* as Engler has done, for in habit, form, and structure of the infloresence there is absolutely no distinction to be found. The only character that can be claimed to separate them depends entirely upon the union of the funicle with the body of the ovule; if the funicle is adnate to the body of the ovule so as to form a raphe it constitutes an *Hydrosme;* if it is not adnate to the body of the ovule then it is an *Amorphophallus,* surely too slight and unimportant a difference to form a genus upon, especially where all other parts of the inflorescence are in such a variable and unstable condition among the various species as in *Amorphophallus,* which, as here understood, is a very natural and easily recognised genus.

Spathe connate into a tube below, hooded above . . 1. *A. Elliotii.*
Spathe convolute in the lower part.
Appendix of spadix short and thick, subglobose ovoid, or fusiform-ovoid, more or less rugose; ovary with a distinct style.
Spathe 3½–6 in. long, obliquely campanulate, open 2. *A. leonensis.*
Spathe 7–13 in. or more long, hooded in the upper part . . . . . 3. *A. dracontioides.*
Appendix of spadix cylindric, fusiform, or tail-like.
Style none, except in 10, *A. Preussii;* 11, *A. laxiflorus;* 19, *A. maculatus,* and 20, *A. gallaensis.*
*Spadix about equalling or shorter than the spathe.
Spathe lobed (abnormally ?) at the apex . . 4. *A. Teuszii.*
Spathe not lobed at the apex.
Margin of spathe undulated.
Flowering part of the spadix about equalling or longer than the appendix; spathe-tube longitudinally ribbed inside . 5. *A. Schweinfurthii.*
Flowering part of the spadix shorter than the appendix.
Spathe-tube about 1¼ in. in diam., smooth inside; spadix 3½–5½ in. long . 6. *A. mossambicensis.*
Spathe-tube about 3¼ in. in diam., covered with short filiform processes inside; spadix 6–6¾ in. long . . . 7. *A. Goetzei.*
Margin of spathe not undulated.
Flowering part of spadix as long as the appendix . . . . . 8. *A. Barteri.*
Flowering part of spadix much shorter than the appendix.
Spathe dark violet . . . . 9. *A. gratus.*
Spathe yellowish-green, purple at the base . . . . . 10. *A. Preussii.*
**Spadix longer than the spathe.
Anthers sparsely scattered . . . . 11. *A. laxiflorus.*

Anthers crowded.
†Appendix of the spadix less than 1 ft. long. (See also 26, *A. Fischeri*).
‡Peduncle $\frac{3}{4}$–$2\frac{1}{2}$ ft. long.
Petiole and peduncle smooth.
Spathe whitish inside, with or without a few green spots on the limb, purple at the base; appendix of the spadix cylindric not tapering upwards . . . . . 12. *A. doryphorus.*
Spathe light yellowish-green or whitish-green inside; appendix of the spadix tapering upwards.
Leaf-segments lanceolate, long-acuminate; spathe about $2\frac{1}{2}$ in. long 13. *A. Baumannii.*
Leaf-segments elliptic-obovate, oblong or elliptic-oblong, cuspidate; spathe 4–7 in. long . 14. *A. flavovirens.*
Spathe dark brownish-purple inside the limb, whitish within the urceolate tube; appendix of the spadix tapering upwards . . . 21. *A. Johnsoni.*
Petiole and peduncle tuberculate . . 15. *A. consimilis.*
‡‡Peduncle $\frac{1}{2}$–$1\frac{1}{2}$ in. long.
Spathe-tube with longitudinal crisped ridges inside . . . . 16. *A. Eichleri.*
Spathe-tube covered with filiform processes inside . . . . . 17. *A. Staudtii.*
††Appendix of the spadix a foot or more in length.
†Peduncle tall.
§Limb of the spathe ovate, produced into an acute or obtuse point.
Base of the spathe hairy or with soft bristle-like processes inside.
Spathe about 6 in. long . . 18. *A. calabaricus.*
Spathe more than 6 in. long.
Style 1 lin. long . . . 19. *A. maculatus.*
Style none; stigma sessile or subsessile.
Male part of spadix cylindrical, about 1 in. long . . 22. *A. angolensis.*
Male part of spadix obconical, about 2 in. long . . 23. *A. accrensis.*
Base of the 6–10 in. long spathe verrucose or papillate-tuberculate inside; style none.
Flowering part of the spadix $3\frac{1}{2}$ in. long; petiole smooth . . 24. *A. leopoldianus.*
Flowering part of the spadix $2\frac{1}{4}$–$2\frac{1}{2}$ in. long.
Appendix of the spadix $1\frac{1}{2}$ in. thick near the base; petiole tuberculate . . . 25. *A. maximus.*

Appendix of the spadix $\frac{2}{3}$–1 in. thick at the base; petiole unknown	26. *A. Fischeri.*
Base of the 8 in. long spathe smooth inside; style 2 lin. long . .	20. *A. gallaensis.*
§§Limb of the spathe forming a broad frill around the oblique mouth, not produced at the very obtuse apex .	27. *A. Mannii.*
††Peduncle $\frac{3}{4}$–$1\frac{1}{4}$ in. long. (See also 27, *A. Mannii*, and 24, *A. leopoldianus*, in which the length is unknown) . .	28. *A. Zenkeri.*

1. **A. Elliotii,** *Hook. f. in Bot. Mag. t.* 7349. Tuber $2\frac{1}{2}$–3 in. in diam. Leaf about 18 in. diam., glabrous; petiole 2 ft. or more high, spotted on the lower half, smooth; terminal segments 5–8 in. long, 6–7 lin. broad, the others smaller, all linear-lanceolate, acuminate, decurrent at the base. Peduncle 7–10 in. long, pale greyish, slightly tinged with pink, spotted with olive-green, smooth. Spathe rather small, glabrous; tube $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $1\frac{1}{2}$ in. diam., cylindrical, margins connate, not convolute, base truncate and intruded; limb 2–4 in. long, galeate, with the apex curved forward, acute; outside pinkish on the lower part of the tube, lined and thinly spotted with light greyish-olive, upper part of the tube and limb green, densely mottled with brown; inside of limb dull purple, smooth and glabrous in the tube. Spadix much shorter than the spathe, stipitate; stipes 6–7 lin. long, about 2 lin. thick; flowering part cylindric, female 2–3 lin. long, male 6–9 lin. long; appendix $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, 3–5 lin. thick, cylindric or fusiform obtuse, sometimes narrowed into a stipes at the base. Ovaries in 2–3 series, ellipsoid, 1-celled; style very short, about $\frac{1}{4}$ lin. long; stigma small, simple. Ovule solitary, anatropous, on a short funicle

Upper Guinea. Sierra Leone: near Wallia, growing among low grass, *Scott-Elliot*, 4640! and a *cultivated specimen!*

This is the only species known in which the margins of the spathe are connate into a tube; in all the others they are convolute.

2. **A. leonensis,** *Lem. in Hort. Vanhoutt. fasc.* i. 1, *t.* 3, *fig.* 2 *a–b.* Leaf solitary, glabrous; petiole 3–$3\frac{1}{2}$ ft. high, robust, tinged with purple-brown at the base and variegated with dark red-brown and whitish; segments 6–8 in. long, $\frac{1}{4}$–$\frac{3}{4}$ in. broad, linear, acute, decurrent. Peduncle 3–8 in. long, smooth, enclosed at the base in 3–4 membranous bracts 2–4 in. long; inner bracts purplish, spotted with white. Spathe $3\frac{1}{2}$–6 in. long, $2\frac{1}{2}$–$3\frac{1}{2}$ in. diam., obliquely funnel-shaped, convolute below, obtuse, apiculate, outside purplish-brown, marked with numerous pale veins and some whitish or yellowish spots, inside glabrous and smooth, pale rosy or whitish, with bright red-brown stripes. Spadix shorter or a little longer than the spathe, 3–5 in. long. Ovary ovoid or subglobose, abruptly contracted into a style $\frac{2}{3}$–$\frac{3}{4}$ lin. long. Anthers quadrate. Appendix $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, $1\frac{3}{4}$–$2\frac{1}{2}$ in. diam., globose or ovoid,

obtuse, labyrinthically rugose, dark purple-brown. Berries ½ in. long, oblong or oblong-obovoid, orange or orange-yellow.—Flore des Serres, ii. Oct. t. 161; Bot. Mag. t. 7768. *Arum aphyllum*, Hook. in Gray, Trav. in Western Africa, 386, t. A. *Corynophallus Afzelii*, Schott in Oesterr. Bot. Wochenbl. 1857, 389, Gen. Aroid. t. 32, and Prod. Aroid. 132; Mast. in Gard. Chron. 1872, 1619, fig. 343 (spadix inaccurate). *C. leonensis*, Engl. in DC. Monogr. Phan. ii. 326. *Hydrosme leonensis*, Engl. Jahrb. i. 187; Engl. & Prantl, Pflanzenfam. ii. iii. 128, and Nachträge zu ii.–iv. 59; Durand & Schinz, Consp. Fl. Afr. v. 474; Rendle in Cat. Afr. Pl. Welw. ii. 87.

Upper Guinea. Futa Jallon: near the River Nunez, *Gray*. Sierra Leone: on grassy mountain slopes near Freetown, *Welwitsch*, 219! and without precise locality, *Afzelius! Scott-Elliot!*

Var. *spectabilis*, N. E. Br. Lower part of the petiole puce-coloured and marked with dark linear-oblong spots. Leaf-segments 4–8 lin. broad.—*Corynophallus Afzelii*, Schott, var. *spectabilis*, Mast. in Gard. Chron. 1872, 1619. *C. leonensis*, Engl., var. *spectabilis*, Engl. in DC. Monogr. Phan. ii. 326. *Hydrosme leonensis*, Engl., var. *spectabilis*, Durand & Schinz, Consp. Fl. Afr. v. 474.

Upper Guinea. Sierra Leone: *Cultivated specimen!*

Var. *elegans*, N. E. Br. Petiole green. Leaf-segments narrow, 3–4½ lin. broad, drooping.—*Corynophallus Afzelii*, Schott, var. *elegans*, Mast. in Gard. Chron. 1872, 1619. *C. leonensis*, Engl., var. *elegans*, Engl. in DC. Monogr. Phan. ii. 326. *Hydrosme leonensis*, Engl., var. *elegans*, Durand & Schinz, Consp. Fl. Afr. v. 474.

Upper Guinea. Sierra Leone: *Cultivated specimen!*

Var. *latifolia*, N. E. Br. Petiole green. Leaf less divided than in the other forms; segments ½–1 in. broad.—*Corynophallus Afzelii*, Schott, var. *latifolia*, Mast. in Gard. Chron. 1872, 1619. *C. leonensis*, Engl., var. *latifolia*, Engl. in DC. Monogr. Phan. ii. 326. *Hydrosme leonensis*, Engl., var. *latifolia*, Durand & Schinz, Consp. Fl. Afr. v. 474.

Upper Guinea. Sierra Leone: *Cultivated specimen!*

The inflorescence of the above three varieties is unknown, but I doubt if they are more than slightly different forms of the typical plant, and scarcely worth distinguishing by names.

3. **A. dracontioides,** *N. E. Br.* Tuber "large, flattened" (*Barter*), "as large as a child's head" (*Johnson*), "as large as a Cheshire cheese" (*Irving*). Leaves 5 ft. high (*Johnson*), "18 in. high, finely cut" (*Barter*); petiole smooth; segments 3–10 in. long, 2½–7 lin. broad, linear or linear-lanceolate, tapering to a fine point, decurrent. Peduncle ⅔–2 ft. long, green suffused with purple, and spotted with blackish-purple, smooth. Spathe 7–13 in. or more long, 3–8 in. diam., convolute for half its length, cylindric or campanulate at the base, then dilating into an ovoid cucullate upper part, with an oblique ovate mouth in front, glabrous within and without, dull purple, striped with darker purple and spotted with whitish, or light green mottled with brown on the outside, shading into a bluish-flesh tint or whitish at the base, inside rich dark velvety-purple in the upper part, and striped with white and purple-red in the tube. Spadix not exceeding the convolute part of the spathe, stipitate; stipes ⅓–½ in. long, cylindric;

flowering part dense, female $\frac{1}{3}$–$\frac{3}{4}$ in. long, cylindric, male 1–$1\frac{3}{4}$ in. long, stout, obconic; appendix 2–4 in. long, 1–$3\frac{1}{2}$ in. thick, ovoid, obtuse, blackish-purple or yellowish-green, rugose. Ovary ovoid, 1-celled, green; style 1–$1\frac{1}{3}$ lin. long, jointed near the middle; stigma small, discoid or cushion-like. Anthers very crowded, pale brownish-green.—*Hydrosme dracontioides*, Engl. Jahrb. xv. 461, t. 18; Durand & Schinz, Consp. Fl. Afr. v. 473; Engl. & Prantl, Pflanzenfam. Nachträge zu ii.–iv. 59.

Upper Guinea. Gold Coast: Kpong, on the Volta River, *Johnson*, 662! Togoland: in bush by the River Angar in Anyanga district, near Bismarkburg, *Büttner*, 419 (ex *Engler*). Lagos: Abeokuta (drawing), *Irving!* and at Illaro, *Millen*, 125 of 1893 collection! Niger Territory: Nupe, in moist ground, *Barter*, 1141!

The leaf with Barter's specimen is only a foot high, evidently from a juvenile plant. The spathe in Dr. Irving's drawing is 13 in. long, and he states that it is "a small specimen to fit the paper, generally 3 times larger." I can see no difference between the specimens collected by Barter and Johnson, and Dr. Irving's drawing, except as to size. This plant was referred by Schott to *Corynophallus Afzelii* (*A. leonensis*), but the ovoid, cucullate limb of the spathe at once distinguishes it from that species. The figure given by Engler appears to be that of an immature (unopened) spathe viewed sideways.

4. **A. Teuszii,** *N. E. Br.* Leaf 2–$2\frac{1}{2}$ ft. diam. glabrous; petiole 2 ft. (or more ?) long, green, smooth; terminal segments 3–$4\frac{1}{2}$ in. long, $\frac{1}{2}$ in. broad, the others smaller, all narrowly lanceolate, gradually tapering to a long acuminate point, decurrent at the base. Peduncle $1\frac{1}{2}$–2 in. long, smooth. Spathe 5–6 in. long, convolute for about 1 in. into a cylindric tube 1 in. diam., green outside, pallid within; limb oblong, 3–7-lobed, erect and deeply concave in the lower part; lobes reflexed, green outside, blackish-purple within. Spadix shorter than the spathe; flowering part dense, cylindrical, about 4 lin. thick, slightly tapering in the upper part, female about $\frac{1}{2}$ in. long, male $1\frac{1}{4}$ in. long; appendix 2 in. long, about $3\frac{1}{2}$ lin. thick a little below the middle, thence tapering to the base and to the obtuse apex, slightly directed forwards, greenish. Ovary ovoid, green; stigma sessile, discoid, slightly excavated in the centre, scarcely lobed. Anthers yellow.—*Hydrosme Teuszii*, Engl. in Gartenfl. 1884, t. 1142, Araceæ exsicc. & illustr. 115, and Jahrb. xv. 459; Engl. & Prantl, Pflanzenfam. ii. iii. 128; Durand & Schinz, Consp. Fl. Afr. v. 475, and Études Fl. Congo, i. 276.

Lower Guinea. Angola: Bismark Island, in the River Kuango, *Teusz*, 406!

I have only seen a cultivated leaf of this plant, and I regard the very remarkable lobed spathe figured and described by Engler as probably an abnormal condition, for, judging from the manner in which the spadix bends forward, I believe the perfectly formed spathe will be found to have the limb somewhat hooded, with the apex directed forwards.

5. **A. Schweinfurthii**, *N. E. Br.* Tuber 2–$2\frac{1}{2}$ in. diam., flattened. Leaf about $2\frac{1}{2}$ ft. diam., glabrous; petiole 1–$1\frac{1}{4}$ ft. (or more?) long, smooth; terminal segments 6–8 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, the lowest smaller, all linear-lanceolate, gradually acuminate, decurrent at the

base. Peduncle 4–6 in. long, glabrous, smooth. Spathe erect, glabrous; tube 2 in. long, 1 in. diam. at the top, convolute, narrowly funnel-shaped, inside longitudinally furrowed, dark purple with a pale zone around the mouth; limb 4–4½ in. long, erect, very concave or somewhat hooded, with the apex directed forwards, wavy on the margins, dark purple. Spadix much shorter than the spathe, sessile; flowering part cylindric, dense, female about ¾ in. long, male about 1 in. long, both about 4–5 lin. thick; appendix 1½–1¾ in. long, about ½ in. thick cylindric, obtuse, abruptly contracted at the base, apparently dark purple, smooth. Ovary ovoid, 2-celled; stigma large, subsessile, two lobed. Stamens crowded; filaments stout, ⅔ lin. long; anther-cells subglobose.—*Hydrosme Schweinfurthii*, Engler in DC. Monogr. Phan. ii. 322, Jahrb. xv. 460, and Pfl. Ost-Afr. C. 132; Engl. & Prantl, Pflanzenfam. ii. iii. 128; Durand & Schinz, Consp. Fl. Afr. v. 474, and Études Fl. Congo, i. 276.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 1806! Niamniam; Makporru Hill, *Schweinfurth*, 3732 (ex *Engler*) and Nabanda-Juru Steppe, *Schweinfurth*, 3573 (ex *Engler*).

Mozamb. Dist. German East Africa: Karatschongo, *Fischer*, 617 (ex *Engler*).

Probably some juvenile leafy specimens (*Schweinfurth*, 1895) collected at Jur Ghattas also belong to this species. See also a note under 30, *A. abyssinicus*, N. E. Br.

6. **A. mossambicensis,** *Klotzsch ex Garcke in Peters, Reise Mossamb. Bot.* 509, *t.* 56. Tuber depressed, about 2–2½ in. diam. Leaf not seen. Peduncle 6–9 in. long, smooth. Spathe convolute below, glabrous inside and out; tube 1½–2 in. long, about 1¼ in. diam. at the mouth, campanulate-infundibuliform; limb probably very concave, 3½–4½ in. long, 3–3½ in. broad when flattened out, suberect, broadly ovate, obtuse or subacute, undulated, dark purple. Spadix about equalling or a little shorter than the spathe; flowering part cylindric, dense, female about ½ in. long, male 1–1¼ in. long, 3–3½ lin. thick; appendix 2–3½ in. long, rather slender, 2–3 lin. thick, cylindric or slightly tapering upwards, obtuse. Ovary ellipsoid, 1-celled; stigma discoid, sessile.—*Hydrosme mossambicensis*, Schott, in Oesterr. Bot. Wochenbl. 1857, 389, Gen. Aroid. t. 33, and Prod. Aroid. 132; Peters, Reise Mossamb. Bot. 509, t. 56; Engl. in DC. Monogr. Phan. ii. 324, Jahrb. xv. 458, and Pfl. Ost-Afr. C. 132; Durand & Schinz, Consp. Fl. Afr. v. 474. *Corynophallus mossambicensis*, O. Kuntze, Rev. Gen. Pl. ii. 741.

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; mountains of Lupata and in other places in Rios de Sena, *Peters* (ex *Garke*). British Central Africa: North Nyasaland; on the banks of the Nsessi River, in damp sand, *Scott!*

7. **A. Goetzei,** *N. E. Br.* Tuber depressed, about 3¼ in. diam. Cataphyllary leaves 3–4 in. long, nearly as long as the peduncle, which is 4–4¾ in. long. Spathe green outside; tube 2⅓–2¾ in. long and about 3¼ in. in diam., obliquely campanulate, densely covered with short filiform processes inside; limb 4¾–6 in. long and 4 in. broad, oblong-ovate, obtuse, undulated, marked with violet nerves inside. Spadix shortly

exceeding the spathe; female part $\frac{3}{4}$–1 in. long, and about $\frac{2}{3}$ in. thick; male part much thicker than the female portion, $1\frac{1}{6}$–$1\frac{1}{3}$ in. long, $\frac{3}{4}$ to nearly 1 in. thick; appendix 6–$6\frac{3}{4}$ in. long, gradually tapering upwards, dull violet. Ovary cylindric; stigma cushion-like. Anthers subsessile, depressed at the apex.—*Hydrosme Goetzei*, Engl. Jahrb. xxviii. 355.

Mozamb. Dist. German East Africa: between Khutu and Uhele districts, on the east side of Vidunda Mountain, 1600 ft., *Goetze*, 407.

I have not seen this species; it is said to be allied to *A. mossambicensis*, but differs in the broader tube of the spathe and much stouter spadix.

8. **A. Barteri,** *N. E. Br.* Peduncle of the specimen seen $2\frac{1}{4}$ in. long, probably longer, about $3\frac{1}{2}$ lin. thick, smooth, glabrous. Spathe glabrous; tube convolute, apparently green outside, longitudinally furrowed and purple-brown inside; limb 5 in. long, $3\frac{1}{2}$ in. broad, erect, elliptic, obtuse, dark purple-brown. Spadix much shorter than the spathe, sessile; flowering part cylindric, dense, $3\frac{1}{2}$–4 lin. thick, female about $\frac{3}{4}$ in. long, male $1\frac{1}{4}$ in. long; appendix $1\frac{3}{4}$–2 in. long, $3\frac{1}{2}$ lin. (or more?) thick, cylindric or somewhat fusiform, obtuse, smooth, furrowed at the base, blackish-purple. Ovary ovoid-oblong, 2-celled; stigma sessile, large, discoid.—*Hydrosme Fontanesii*, Schott, Prod. Aroid. 133; Engl. in DC. Monogr. Phan. ii. 322; Durand & Schinz, Consp. Fl. Afr. v. 474, excl. syns. *Hansalia Fontanesii*, Schott in Miq. Ann. Mus. Lugd.-Bat. i. 279 in obs.

Upper Guinea. Niger Territory: Nupe, in shady places, *Barter*, 502 partly!

The inflorescence above described is that upon which Schott founded his description of *Hydrosme Fontanesii* and *Hansalia Fontanesii*, and is most unlikely to be the same as *A. Fontanesii*, Kth., of which the leaf only is known. Possibly *A. Barteri* may prove to be the same as *A. gratus*, N. E. Br., which I have not seen, but from description seems very similar, except as to the size of the parts of the inflorescence.

The leaf with Barter, 502, belongs to *Anchomanes dubius*.

The leaf described by Schott and Engler as belonging to *Hydrosme Fontanesii* may not belong to the inflorescence described above as *A. Barteri*, and does not agree with the original description of *Amorphophallus Fontanesii*. It was collected in Nupe by Barter (1468), whose label states that it is 2 ft. high, and was found growing in the crevices of rocks; the specimen itself is about 1 ft. in diam., the three primary branches are only once forked, with 4–5 segments to each secondary branch, terminal segments $2\frac{1}{4}$–$3\frac{1}{4}$ in. long, $1\frac{1}{4}$–$1\frac{3}{4}$ in. broad, obovate, shortly and abruptly cuspidate at the apex, cuneate and rather broadly decurrent at the base.

9. **A. gratus,** *N. E. Br.* Petiole long, spotted with dark fuscous. Ultimate segments of the leaf "linear-lanceolate" (*Schott*), or "oblong-lanceolate" (*Schott*), cuspidate-acuminate, confluent. Spathe $4\frac{3}{4}$ in. long, 2 in. broad, "oblong, acute" (*Engler*), "lamina rounded" (*Schott*), dark violet. Spadix shorter than the spathe; flowering part cylindric, female 5 lin. long, 5 lin. thick, male 7–8 lin. long, about $2\frac{1}{2}$ lin. thick; appendix $2\frac{1}{3}$ in. long, about $3\frac{1}{2}$ lin. thick, subcylindric, obtuse, constricted at the base.—*Hansalia grata*, Schott in Oesterr. Bot. Zeitschr. 1858, 82, Prod. Aroid. 133, and in Miq. Ann. Mus. Lugd.-Bat. i. 279 in obs. *Hydrosme grata*, Engl. in DC. Monogr. Phan. ii. 323, and Jahrb.

xv. 458; Durand & Schinz, Consp. Fl. Afr. v. 474. *Corynophallus gratus*, O. Kuntze, Rev. Gen. Pl. ii. 741.

Upper Guinea. Niger Territory, *Hansal.*

In the original description of this plant (Oesterr. Bot. Zeitschr. 1858, 82), Schott states that the segments of the leaf are "linear-lanceolate" and resemble those of *Corynophallus Afzelii*, Schott (*A. leonensis*, Lem.), whilst in his Prod. Aroid. he describes them as "obverse oblong-lanceolate, cuspidate-acuminate." The odour is said to be fragrant. I have not seen the plant, but it seems to be very similar to *A. Barteri*, N. E. Br., and to differ in being smaller in all parts.

10. **A. Preussii,** *N. E. Br.* Leaf about 2 ft. in diam., glabrous; petiole about 2 ft. long, smooth, marked with transverse or oblique spots; terminal segments 5–7 in. long, $1\frac{1}{2}$–$1\frac{3}{4}$ in. broad, oblanceolate, very acuminate, with a point 1–$1\frac{1}{4}$ in. long, tapering to a decurrent base, the other segments lanceolate or elliptic-lanceolate. Peduncle 16–20 in. long. Spathe about $4\frac{3}{4}$ in. long, convolute below, yellowish-green, purple at the base; limb oblong, acute. Spadix shorter than the spathe; flowering part cylindric, dense, female about $5\frac{1}{2}$ lin. long, $5\frac{1}{2}$ lin. thick, male about 7 lin. long, and $4\frac{1}{2}$ lin. thick; appendix $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, 2–3 lin. thick, subcylindric. Ovary ovoid, 2-celled; style short; stigma capitate.—*Hydrosme Preussii*, Engl. Jahrb. xv. 459; Durand & Schinz, Consp. Fl. Afr. v. 474.

Upper Guinea. Cameroons: near a stream west of Buea, 3000 ft., *Preuss*, 588!

I have only seen the leaf of this species.

11. **A. laxiflorus,** *N. E. Br.* Leaf unknown. Peduncle 12–16 in. long. Spathe about $5\frac{1}{2}$ in. long, convolute below, glabrous, blackish-purple; tube about $1\frac{3}{4}$ in. long, $1\frac{1}{4}$ in. diam. at the oblique mouth, narrowly funnel-shaped; limb erect, elongate-deltoid, acute, margin undulate. Spadix (imperfect) probably longer than the spathe, sessile; flowering part cylindric, female 10 lin. long, 5 lin. thick, dense, male 2–$2\frac{1}{4}$ in. long, 3 lin. thick, sparsely covered with anthers; appendix (upper part broken off) $\frac{1}{4}$ inch thick, terete, tapering at the base, smooth. Ovary ovoid, 1-celled, tapering into a slender style about 1 lin. long; stigma small, discoid.—*Hydrosme sparsiflora*, Engl. Jahrb. xv. 461, t. 14, figs. J–Q, and Pfl. Ost-Afr. C. 132; Durand & Schinz, Consp. Fl. Afr. v. 475.

Nile Land. British East Africa: Ukamba; Kitui, *Hildebrandt.*

I have not seen this species. The name has been changed because of the pre-existing *A. sparsiflorus*, Hook. f.

12. **A. doryphorus,** *Ridley in Journ. Bot.* 1886, 305. Tuber 3–4 in. in diam. Leaf about 2 ft. in diam., glabrous; petiole 2 ft. or more high, $\frac{1}{2}$–$\frac{3}{4}$ in. thick at the base, green, not variegated, smooth; terminal segments $3\frac{1}{2}$–$4\frac{1}{2}$ in. long, $1\frac{1}{4}$-$1\frac{1}{2}$ in. broad, the others smaller, all elliptic-oblong, acuminate, cuneate at the base, narrowly decurrent. Peduncle 1–$1\frac{1}{2}$ ft. long, about $\frac{1}{2}$ in. thick at the base, variegated with olive-brown and dark green on a paler ground, smooth. Spathe erect, outside of a somewhat glaucous green, shading upwards into light pinkish-grey,

spotted in the lower part with dark green, inside whitish, with or without a few green spots on the limb, smooth and dark purple at the base; tube convolute, $1\frac{1}{4}$–2 in. long, ovoid or subcylindric; limb $1\frac{1}{2}$–3 in. long, ovate, acuminate. Spadix longer than the spathe, sessile; flowering part cylindrical, female 3–4 lin. long, male $\frac{3}{4}$–$1\frac{1}{4}$ in. long; appendix 3–$5\frac{1}{2}$ in. long, $2\frac{1}{2}$–5 lin. thick, terete, obtuse, not tapering upwards, smooth, purplish-red. Ovaries in 4–5 series, crowded, subglobose, light green; stigma subsessile, discoid. Anthers densely crowded, dull yellowish.

Upper Guinea. Gambia: St. Mary's Island, *Maxwell!* and without precise locality, *Lester!*

13. **A. Baumannii,** *N. E. Br.* Tuber depressed. Leaf solitary; petiole green; ultimate segments of the (undeveloped) blade $3\frac{1}{4}$–4 in. long, 5 lin. broad, lanceolate, long-acuminate. Peduncle about 1 ft. long, included for more than $\frac{1}{3}$ of its length in the purplish cataphyllary leaves. Spathe about $2\frac{1}{2}$ in. long, and rather more than $1\frac{1}{2}$ in. broad, ovate, obtuse, convolute, pale green. Spadix about 3 times as long as the spathe; female part about 5 lin. long, cylindric; male part 7 lin. long, obconic, about $\frac{1}{4}$ in. thick at the base, and $\frac{1}{2}$ in. thick in the upper part; appendix about 5 in. long, tapering upwards, smooth. Ovary ovoid; stigma sessile, broadly orbicular.—*Hydrosme Baumannii*, Engl. Jahrb. xxvi. 420.

Upper Guinea. Togoland: Agome, *Baumann*, 204.

I have not seen this species. Engler states that it has the habit of *A. consimilis*, Bl., in which the petiole and peduncle are tuberculate, but as he does not describe any tuberculation on these organs, I have assumed them to be smooth in the analytical key to the species.

14. **A. flavovirens,** *N. E. Br.* Leaf about $1\frac{1}{2}$–2 ft. in diam., glabrous; petiole 2 ft. or more high, variegated, smooth; terminal segments $3\frac{1}{4}$–4 in. long, $1\frac{1}{2}$ in. broad, the others smaller, oblong, elliptic-oblong or elliptic-obovate, rather abruptly cuspidate-acuminate, tapering towards the decurrent base. Peduncle 2–$2\frac{1}{2}$ ft. long, light green, without spots, smooth. Spathe erect, light green outside without markings, whitish-green bordered with yellowish-green inside, dusted with purplish at the base; tube funnel-shaped, convolute, $1\frac{1}{4}$–$2\frac{1}{2}$ in. long, papillate-verrucose inside; limb $2\frac{1}{2}$–4 in. long, ovate, obtuse, or obtusely acuminate, with recurved or undulated margins. Spadix longer than the spathe, stipitate; stipes 2–3 lin. long; flowering part slightly thickened upwards, female 4–10 lin. long, $\frac{1}{2}$ in. thick, male 10–13 lin. long, 7–$7\frac{1}{2}$ lin. thick at the top; appendix 6–8 in. long, 9–10 lin. thick at the base, gradually tapering to a somewhat obtuse point, yellow. Ovaries in 5–8 spirals, lax or somewhat crowded, subglobose, green; stigma sessile, very large, somewhat mitre-shaped, bifid, or in the dried state apparently orbicular, cinnamon-brown. Anthers densely crowded, yellow.

Upper Guinea. Gold Coast: in a valley near Aburi, *Johnson*, 25! Kwabu, *Johnson*, 644!

15. **A. consimilis,** *Blume, Rumphia,* i. 149. Petiole densely covered with small tubercles. Peduncle 10–11 in. long. Spathe (mutilated) $2\frac{1}{2}$ in. long, $1\frac{1}{2}$–$1\frac{3}{4}$ in. broad, ovate, acuminate. Spadix (imperfect) probably longer than the spathe; female part 3–4 lin. long; male part about 7 lin. long; appendix about $1\frac{1}{4}$ in. long (*Engler*), 2 lin. thick. Ovary 1-celled.—Hook. Niger Fl. 527. *Hydrosme prieuriana,* Schott in Miq. Ann. Mus. Lugd.-Bat. i. 279. *H. consimilis,* Engl. in DC. Monogr. Phan. ii. 325; Engl. Jahrb. xv. 458; Durand & Schinz, Consp. Fl. Afr. v. 473. *Brachyspatha consimilis,* Schott, Prod. Aroid, 127. *Corynophallus consimilis,* O. Kuntze, Rev. Gen. Pl. ii. 741.

Upper Guinea. Cape Verd Promontory, on the borders of woods in sandy soil, *Leprieur.*

I have not seen this species.

16. **A. Eichleri,** *Hook. f. in Bot. Mag. t.* 7091. Tuber $2\frac{1}{2}$–3 in. diam., depressed-globose. Leaf about 2 ft. diam., glabrous; petiole 1–2 ft. long, smooth, green; terminal segments 3–5 in. long, $1\frac{1}{4}$–$2\frac{1}{4}$ in. broad, the others smaller, all elliptic-obovate or elliptic-oblong, shortly and abruptly acuminate, narrowed to a decurrent base. Peduncle $\frac{1}{2}$–$1\frac{1}{4}$ in. long, smooth, green. Spathe small, 2–3 in. long, obliquely campanulate; tube convolute, about as broad as long, its margin recurved, forming a broad wavy frill dorsally prolonged into a short, broadly ovate, spreading, obtuse apex; outside pale greenish-white with darker lines; inside of tube with numerous longitudinal crisped rugosities, rich dark purple with a broad white zone around its mouth, frill and apex dark purple-brown. Spadix about twice as long as the spathe, sessile or subsessile; flowering part cylindric, female 3–4 lin. long, male 5–9 lin. long, separated from the female by a naked space 1–$1\frac{1}{2}$ lin. long; appendix $2\frac{1}{2}$–$3\frac{3}{4}$ in. long, 4–8 lin. thick, conoid or conoid-fusiform, obtuse. Ovaries not crowded, subglobose, 2-celled; stigma sessile, very stout, 2-lobed.—*Hydrosme Eichleri,* Engl. in Jahrb. Bot. Gart. Berl. ii. 285, t. 10, and Jahrb. xv. 458; Durand & Schinz, Consp. Fl. Afr. v. 474, and Études Fl. Congo, i. 276.

Lower Guinea. Angola: Bismark Island, in the River Kuango, cultivated specimens, *Teusz!*

17. **A. Staudtii,** *N. E. Br.* Leaf unknown. Peduncle about $1\frac{1}{2}$ in. long. Spathe about $3\frac{1}{2}$ in. long and $2\frac{1}{3}$ in. diam., convolute, campanulate, undulated on the pale brown margin; basal half of the tube covered inside with numerous filiform processes, blackish-purple. Spadix about twice as long as the spathe; male and female parts each about 5 lin. long, about $\frac{1}{3}$ in. thick, cylindric; appendix $5\frac{1}{2}$–6 in. long, about $\frac{1}{4}$ in. thick at the base, slender, tail-like. Ovary ovoid; stigma sessile, broadly orbicular.—*Hydrosme Staudtii,* Engl. Jahrb. xxvi. 420.

Upper Guinea. Cameroons: Johann Albrechts-Höhe, near Barombi, *Staudt,* 767.

I have not seen this species; it appears to be very closely allied to *A. Eichleri,* Hook. f., differing in having filiform processes in the tube of the spathe and a more slender appendix to the spadix.

18. **A. calabaricus,** *N. E. Br.* "Plant 2–3 ft. high" (*Mann*). Leaf not seen. Peduncle 1½ ft. (or more?) high, about ½ in. thick at the base, smooth. Spathe convolute below; tube 2½ in. long, about 2 in. diam. at the top, funnel-shaped, outside glabrous, inside hairy at the base; limb about 3½ in. long, erect, ovate, acute, apparently purplish, at least along the border. Spadix more than twice as long as the spathe; flowering part dense, female 6–7 lin. long, 4 lin. thick, cylindric, male 1 in. long, obconic, thickened upwards, 6 lin. thick at the top; appendix more than 13 in. long, apex broken off in the specimen seen, nearly an inch thick a little above the base, thence tapering to the apex, smooth, apparently greenish or yellowish, pallid olive in the dried state. Ovary subglobose; stigma sessile.

Upper Guinea. Niger Territory: Old Calabar River, *Mann*, 2336!

19. **A. maculatus,** *N. E. Br.* Leaf about 2½ ft. diam.; petiole about 2½ ft. long, smooth, light green, marked with numerous rather large oval confluent olive-green spots; terminal segments 6–8 in. long, 2–2½ in. broad, lanceolate or oblong-lanceolate, acuminate; lateral segments smaller, elliptic or oblong, acuminate or cuspidate-acuminate. Peduncle 2 ft. long, smooth, coloured like the petiole. Spathe convolute below; tube 4–5 in. long, green, spotted with dark grey outside, densely hairy at the base inside; limb about 8 in. long, 6 in. broad, expanded, ovate, subacute, suffused and veined with deep red on a green ground, glabrous. Spadix very shortly stipitate, twice as long as the spathe; flowering part cylindric, ¾–1 in. thick, female 1½–2 in. long, male 1 in. long; appendix 15–16 in. long, ¾ in. thick, cylindric, obtuse, dark violet. Ovaries somewhat crowded, ovoid, 2-celled; style 1 lin. long, stout; stigma very thick, 2-lobed. Anthers crowded.

Lower Guinea. Congo or Gaboon: *Cultivated specimen!*

Described from a living plant sent to Kew in 1892 by Mr. Godefroy Lebeuf, who was uncertain as to its native habitat.

This species closely resembles the Japanese *A. Konjac*, C. Koch, but in that species the tube of the spathe is only rugulose-tuberculate inside, without hairs, whilst in *A. maculatus* it is thickly covered with hairs or hair-like processes inside in the lower part. Of the African species it seems nearest to *A. gallaensis*, N. E. Br. and *A. angolensis*, N. E. Br.

20. **A. gallaensis,** *N. E. Br.* Tuber depressed-globose, about 2⅓ in. diam. Leaf unknown. Peduncle about 1 ft. long, smooth. Spathe oblong, convolute, obliquely funnel-shaped; tube 4 in. long, 1¼ in. diam., smooth inside, blackish-purple in the basal part; limb 4 in. long, very undulated at the purple margin. Spadix 1½ times as long as the spathe; female part ¾ in. long, cylindric; male part about 1⅙ in. long, turbinate; appendix 1 ft. long, elongated-conoid, smooth. Ovary subglobose; style 2 lin. long; stigma slightly 3-lobed.—*Hydrosme gallaensis*, Engl. Jahrb. xxvi. 422.

Mile Land. Gallaland: Robe Mountain, in the region of the sources of the River Dana, *Riva*, 410.

I have not seen this species; from its long styles and other characters it would

appear to be allied to *A. maculatus*, N. E. Br., differing in its smaller inflorescence and absence of hairs inside the tube of the spathe.

21. **A. Johnsoni,** *N. E. Br.* Tuber depressed. Leaf about 2 ft. in diam., glabrous; petiole $1\frac{1}{4}$–2 ft. long, smooth; terminal segments 5–6 in. long, $1\frac{1}{4}$–$1\frac{1}{3}$ in. broad, oblong, acuminate or somewhat cuspidate-acuminate, cuneate and narrowly decurrent at the base. Peduncle $2\frac{1}{2}$–3 ft. high, smooth, spotted, at least on the upper part. Spathe erect; tube convolute, $3\frac{1}{4}$–4 in. long, about 3 in. diam., urceolate or pear-shaped, distinctly constricted just below the mouth, tapering to the base, pale green, spotted with darker green on the lower part, passing into deep reddish or brownish-purple on the upper part outside, inside the tube is whitish and densely covered with short soft bristle-like processes or very stout hairs on the basal part; limb about $4\frac{1}{2}$ in. long, broadly ovate, obtusely pointed, oblique or somewhat spreading, entirely dark brownish-purple on both sides, the colour abruptly changing to white inside at the constriction of the tube. Spadix longer than the spathe, sessile; female part in the dried state about 1 in. long, cylindric; male about $1\frac{1}{4}$ in. long, slightly obconic; appendix about 9 in. long, 13–14 lin. thick in the lower part, gradually tapering to an obtuse point, smooth, very dark purple-brown. Ovaries depressed globose; stigma subsessile, with 2 large lobes. Anthers densely crowded.

Upper Guinea. Gold Coast; Kwabu, *Johnson*, 643 !

22. **A. angolensis,** *N. E. Br.* Leaf 2 ft. or more in diam., glabrous; petiole 3–5 ft. long, smooth, spotted with red at the base; terminal segments 4–6 in. long, 1–$1\frac{1}{3}$ in. broad, the others smaller, oblong-lanceolate or elliptic-oblong, somewhat abruptly acuminate, decurrent at the base. "Peduncle by the side of the leaf, variegated with green and purple" (*Welwitsch*), 10–12 in. long in the specimens seen, probably longer, smooth. Spathe 11–12 in. long, cucullate, shorter than the spadix, spreading, subacuminate, wavy on the margin, hairy at the base inside. Spadix very long; flowering part dense, cylindric, female about 2 in. long, male about 1 in. long; appendix long, terete, obtuse, naked, blackish-purple. Ovary oblong-ovoid; stigma sessile, 2-lobed. Pollen orange-coloured.—*Hydrosme angolensis*, Welw. ex Schott in Journ. Bot. 1865, 35; Engl. in DC. Monogr. Phan. ii. 324; Engl. Jahrb. i. 487, and xv. 458; Durand & Schinz, Consp. Fl. Afr. v. 473; Rendle in Cat. Afr. Pl. Welw. ii. 86. *Corynophallus angolensis*, O. Kuntze, Rev. Gen. Pl. ii. 741.

Lower Guinea. Gaboon, *Bellay*, 285 (ex *Engler*). Angola: Cazengo; in shady mountainous places by the streams of Muxaula, *Welwitsch*, 227 ! Pungo Andongo; in shady, rocky valleys of the Præsidium of Pungo Andongo, rare, *Welwitsch*, 228 ! (not 288 as quoted by authors).

According to Welwitsch's notes this would appear to produce its flower and leaf at the same time, since, besides stating that the peduncle is by the side of the leaf, he adds at the foot of the label of No. 228 "c. fl. (with flower) Dec. 1857 and Jan. 1857." Schott describes the spadix as being often 2 ft. long, but on the copy of

Welwitsch's note in the British Museum it reads "I have seen it nearly 6 ft. long." The figure 6 may, however, be an error of copying. There is no spathe or perfect spadix of this species either at Kew or the British Museum.

23. **A. accrensis,** *N. E. Br.* Leaf not seen. Peduncle 8 in. long in the specimen seen, but probably longer, olive-green, not spotted, smooth. Spathe convolute for about $\frac{1}{3}$ of its length, about 6 in. long, in the dried and very shrivelled specimen seen, but according to a drawing made from the living plant about 1 ft. long and 8 in. diam. across the oblique mouth; tube somewhat campanulate-funnel-shaped, not at all constricted at the mouth, glabrous and green outside, without spots, pale yellowish-white within, at least in the upper part, and densely covered with stout curved hairs or soft bristles in the basal part; limb ovate, obtuse, suberect, frilled, broadly bordered with dark purple. Spadix three times as long as the spathe, sessile; female part about 2 in. long, cylindric; male part about 2 in. long, stout, obconic; appendix about 19 in. long and $1\frac{3}{4}$ in. thick at the base in the dried state, but according to the drawing about $2\frac{1}{2}$ ft. long and $2\frac{1}{4}$ in. thick, gradually tapering from base to apex, smooth, olive-brown. Ovaries not very crowded, oblong, 2-celled; stigma large, sessile, 2-lobed.

Upper Guinea. Gold Coast: Accra! Described from a dried specimen sent to Kew by Messrs. F. Sander & Co., of St. Albans, in January, 1900, which had been received by them from Accra.

24. **A. leopoldianus,** *N. E. Br.* Leaf nearly 3 ft. diam., glabrous; petiole 2 ft. long, somewhat flattened, smooth, green, with minute purple spots near the base; terminal segments 3–4 in. long, 7–9 lin. broad, the others smaller, all lanceolate, acuminate, decurrent at the base. Peduncle smooth. Spathe convolute for about 4 in. into a ventricose vase-shaped tube, densely verrucose inside at the base; limb 6–8 in. long, ovate, acute, expanded, wavy on the margins, velvety in texture, rich dark brownish-purple. Spadix twice as long as the spathe, subsessile; flowering part cylindric, dense, slightly constricted at the base of the male spike, female about $1\frac{1}{4}$ in. long, male $2\frac{1}{2}$ in. long; appendix 18 in. or more long, about $\frac{3}{4}$ in. thick at the base, gradually tapering to an obtuse apex, smooth. Ovary subglobose; stigma sessile, cushion-like.—*Hydrosme leopoldiana*, Mast. in Gard. Chron. 1887, i. 642, 644, 645, figs. 122, 123; Ill. Hort. xxxiv. 65, t. 23, and xlii. 380, fig. 49; Durand & Schinz, Études Fl. Congo, i. 276.

Lower Guinea (?) Congo Region: *Cultivated specimen!*

The peduncle of the type has been broken off about $1\frac{1}{2}$ in. below the spathe, and in all probability represents only a small portion of it. *A. leopoldianus* is allied to *A. angolensis*, N. E. Br. and *A. maximus*, N. E. Br.; from the former it differs in being densely verrucose instead of hairy at the base of the spathe inside, and from *A. maximus* in its smooth petiole.

25. **A. maximus,** *N. E. Br.* Tuber depressed, oblique. Leaf (juvenile?) about 18 in. diam.; petiole and its three branches rough with small tubercles, variegated with irregular whitish spots on an

olive-green ground; terminal segments $3\frac{1}{2}$–$5\frac{1}{4}$ in. long, $1\frac{1}{2}$–$2\frac{1}{4}$ in. broad, elliptic-obovate, shortly cuspidate, acute, narrowed to the decurrent base. Peduncle $2\frac{1}{2}$ ft. or more long, more than an inch thick at the base, whitish, spotted with purple. Spathe pale rosy outside, spotted with dull green, inside blackish-purple; tube campanulate, about 4 in. long and broad, inside densely verrucose; limb 5–6 in. long, broadly triangular, wavy on the margin. Spadix twice as long as the spathe; flowering part thickened upwards, female about $1\frac{1}{4}$ in. long, 1 in. thick, cylindric, male about $1\frac{1}{4}$ in. long, and about $1\frac{1}{4}$ in. thick at the apex, obconic; appendix about 20 in. long, $1\frac{1}{2}$ in. thick near the base, tapering upwards. Ovaries scattered, ovoid; stigma sessile, orbicular.—*Hydrosme maxima*, Engl. in DC. Monogr. Phan. ii 323, Pflanzenfam. ii. iii. 128, and Pfl. Ost-Afr. C. 132; Durand & Schinz, Consp. Fl. Afr. v. 474. *Corynophallus maximus*, O. Kuntze, Rev. Gen. Pl. ii. 741.

Nile Land. British East Africa: near Mombassa, *Hildebrandt*, 2018, *Engler*, *Aracæ exsicc. and illust.*, 241 !

I have not seen a flowering specimen of this species, but only the leaves from plants cultivated at Berlin and distributed by Engler as *Hydrosme maxima*, which possibly do not belong to the same plant as the inflorescence on which the species was founded. See note under 26, *A. Fischeri*.

26. **A. Fischeri,** *N. E. Br.* Leaf unknown. Peduncle 16–18 in. (or more ?) long, 3–4 lin. thick in the dried state, smooth. Spathe convolute below; tube 2–3 in. long, campanulate-infundibuliform, about 3 in. broad at the mouth, outside glabrous, green marked with small white spots, inside dark coloured at the densely verrucose base with a pale zone above it; limb 4–6 in. long, 3–4 in. broad, more or less spreading, broadly ovate, acute, undulated, both sides green, sprinkled on the outside with small white spots, often broadly bordered with purple. Spadix sessile, twice as long as the spathe; flowering part dense, female 5–9 lin. long, cylindric, male $\frac{3}{4}$–$1\frac{1}{2}$ in. long, 7–12 lin. thick at the top, obconic; appendix 10–16 in. long, 7–12 lin. thick at the base, gradually tapering to the apex, smooth. Ovary subglobose, 2-celled; stigma sessile, thick, 2-lobed.—*Hydrosme Fischeri*, Engl. Jahrb. xv. 460, and Pfl. Ost-Afr. C. 132; Durand & Schinz, Consp. Fl. Afr. v. 474.

Mozamb. Dist. German East Africa: Usukuma; on the watershed of Simiu, *Fischer*, 618 (ex *Engler*); and without precise locality, *Kirk!* British Central Africa: in valleys near Boruma, on the Zambesi, *Menyharth*, 922 !

As I have not seen an authentic example of this plant I have compiled the above description entirely from the specimens collected by Kirk and Menyharth, which I believe to belong to this species, since they quite agree with Engler's description of *Hydrosme Fischeri*, except in having the male part of the inflorescence slightly but distinctly thickened upwards. The description in Engler's Jahrb. however, is somewhat contradictory with regard to this character, as on pp. 458 and 461 the male part of the spadix is stated not to thicken upwards, whilst on p. 460 it is described as somewhat narrowing towards the base. According to description, this species appears to differ from *A. maximus* only by its thicker appendix. The leaves, however, distributed by Engler as *Hydrosme maxima*, have tuberculated petioles, and as a rule the peduncle of the same plant would be tuberculated also, although nothing of this kind is mentioned in the description. If the peduncle is tuberculated in *A.*

maximus, then *A. Fischeri* is doubtless distinct from it, but if it is smooth there seems to be no character of sufficient importance to distinguish them specifically.

27. **A. Mannii,** *N. E. Br.* Leaf very large, probably 4–5 ft. diam.; petiole in the dried state densely sulcate-striate, probably smooth when alive; terminal segments 7–12 in. long, 3½–4 in. broad, oblong or elliptic-oblong somewhat cuspidate-acuminate, narrowed and decurrent at the base. Peduncle furrowed like the petiole. Spathe 6–7 in. long, obliquely campanulate, convolute at the base; tube densely covered inside with curved hair-like processes, dark purple; limb or border much undulated, frill-like, very obtusely rounded at the apex, dark purple. Spadix much longer than the spathe; flowering part cylindric, about 7 lin. thick, female 9–10 lin. long, male about 1 in. long; appendix (imperfect) over a foot long, about ¾ in. thick at the base, gradually tapering to the apex, smooth, dark coloured in the dried state. Ovaries moderately crowded, globose, 2-celled; stigma sessile, discoid. Anthers densely crowded.

Upper Guinea. Fernando Po, *Mann*, 652!

The peduncle of the only specimen seen is very much compressed, and about 2 in. long, but has been broken off, so that it is impossible to say how long it may have been. The leaf-segments of this plant are larger than those of any other species of *Amorphophallus*, except the gigantic *A. Titanum*, Becc., which they rival in size.

28. **A. Zenkeri,** *N. E. Br.* Leaf solitary; petiole 20–24 in. long, its three primary branches divided into two pinnatipartite divisions bearing 4 (often opposite) segments; terminal segments 5–5½ in. long, 2⅓–2¾ in. broad, the others smaller, all oblong-lanceolate, long acuminate, very acute, decurrent at the base. Peduncle ¾–1¼ in. long. Spathe about 8 in. long, and 4 in. diam., convolute, broadly campanulate, undulated at the purple margin; lower part of the tube clothed inside with filiform processes, blackish-purple. Spadix about twice as long as the spathe; female part about 7 lin. long, ½ in. thick, cylindric; male part ¾ in. long, ⅔ in. thick; appendix about 14 in. long, ⅔ in. thick, irregularly sulcate. Ovary shortly ovoid; stigma sessile, orbicular—*Hydrosme Zenkeri*, Engl. Jahrb. xxvi. 421.

Upper Guinea. Cameroons: near Yaunde, in forest, 2600 ft., *Zenker & Staudt*, 53.

This species, of which I have not seen a specimen, seems to be allied to *A. Mannii*, N. E. Br.

Imperfectly known species.

29. **A. Fontanesii,** *Kunth, Enum.* iii. 35. Stemless. "Petiole terete, tripartite at the apex; leaflets many, lanceolate and obovate, acuminate at the apex, unequal, decurrent."—Hook. Niger Fl. 527. *Arum trifidum*, Desfont. Cat. Hort. Par. 7 and 385. *Corynophallus Fontanesii*, O. Kuntze, Rev. Gen. Pl. ii. 741.

Upper Guinea. Senegal.

Unknown to me. It was described from a plant cultivated in the Botanic Garden at Paris, and on account of its lanceolate, acuminate leaflets, and different locality cannot be the plant described as *Hydrosme Fontanesii* by Schott and Engler, for which see *A. Barteri*, N. E. Br.

30. **A. abyssinicus,** *N. E. Br.* Tuber depressed-globose. Spathe pedunculate, glabrous, convolute at the base, enlarged in the upper part, erect, obtuse, margin subrevolute, blackish-purple. Spadix with an oblong-clavate naked apex (appendix). Ovaries numerous. Abortive flowers (neuter organs) none. Stamens very numerous, sessile, opening by two apical pores.—*Arum abyssinicum*, A. Rich. Tent. Fl. Abyss. ii. 352. *Sauromatum abyssinicum*, Schott, Syn. Aroid. 25; Prod. Aroid. 72, not of Engler.

Nile Land. Abyssinia: in the valley of the River Tacazze near Tchelatchekenneh, among stones, *Quartin-Dillon.*

I have not seen this plant, but from the description given by Richard, there can be little doubt that it is a species of *Amorphophallus*, as the convolute spathe and absence of neuter organs are entirely at variance with the characters of the genus *Sauromatum.*

Possibly the specimens collected in Abyssinia by *Steudner*, 707, 709, and quoted by Engler (Jahrb. xv. 460) and Durand & Schinz (Consp. Fl. Afr. v. 474) under *Hydrosme Schweinfurthii*, Engl., may belong to this species.

5. **ZYGANTHERA,** N. E. Br.

Spathe large, convolute at the base. Spadix free, shorter than the spathe, monœcious, lower half fertile, upper half covered with barren organs (staminodes); male, female, and barren parts contiguous; appendix none. Perianth none. Ovary 2-celled; style short; stigma thick, capitate, subbilobed. Ovule solitary in each cell, basal, erect, anatropous. Anthers connate in pairs, sessile; connective stout, much broader than the cells, produced beyond them and dilated into an angular truncate subbilobed apex; cells linear-oblong. Staminodes cuneate-oblong, subclavate, subtruncate or slightly convex at the apex.—A tuberous-rooted herb, flowering before the leaves appear. Leaves unknown. Peduncle very short.

An endemic, monotypic genus.

1. **Z. Buttneri,** *N. E. Br.* Leaf unknown. Peduncle 1¼ in. long, not very thick, concealed by the surrounding cataphyllary leaves, the innermost of which are about 4–5 in. long, 1 in. broad, strap-shaped or oblong-lanceolate, acute. Spathe about 2½ ft. long, convolute for about 3 in. at the base. Spadix 3 in. long, about 7 lin. thick, cylindric, obtuse, densely covered with flowers and staminodes or neuter organs; female part about ½ in. long; male part ¾ in. long; staminodal or neuter part 1¾ in. long. Ovary subglobose; style short; stigma subglobose, slightly 2-lobed. Anthers connate in pairs, sessile, subquadrate; connective dilated at the apex beyond the cells, truncate, angular, faintly 2-lobed, smooth? Staminodes cuneate-oblong, sub-clavate, convexly subtruncate.—*Pseudohydrosme Büttneri*, Engl. Jahrb. xv. 456, t. 17; Engl. & Prantl, Pflanzenfam. Nachtr. zu ii.–iv. 59. *P. Buettneri*, Durand & Schinz, Consp. Fl. Afr. v. 475.

Lower Guinea. Gaboon: Munda district; Sibange Farm, *Büttner*, 519.

Engler places this plant under his genus *Pseudohydrosme*, but according to his description and figure, for I have not seen the plant, the differences between this

and *Pseudhydrosme gabunensis*, Engl., are such, that they ought not, in my opinion, to be placed in the same genus, I have, therefore, generically separated them. Engler states that the spathe of the specimen of *L. Buttneri*, according to the collector's notes, has about 2 ft. of the upper part wanting; it is, therefore, only very shortly convolute at the base, and not nearly to the obliquely truncate top as in *Pseudhydrosme;* the anthers of *Zyganthera* are connate in pairs, the upper half of the spadix is covered with barren organs, and the ovules are short and broad, whilst in *Pseudhydrosme* the anthers are free, different in character, the spadix has no barren organs, and the ovules are long and narrow.

6. **PSEUDHYDROSME**, Engl. Jahrb. xv. 455.

Spathe funnel-shaped, convolute to the obliquely truncate top. Spadix free, monœcious, fertile to the apex; male and female parts contiguous; appendix none; staminodes or neuter organs none. Perianth none. Ovary 2-celled; style short; stigma slightly bilobed. Ovules solitary in each cell, affixed near the base of the axile placenta on very short funicles, erect, anatropous. Anthers free, compressed, 2-celled; connective rather broad, produced beyond the cells into a transverse sub-bilobed knob; cells linear, opposite.—A tuberous rooted herb, flowering before the leaves appear. Leaves unknown. Peduncle very short.

An endemic monotypic genus.

1. **P. gabunensis,** *Engl. Jahrb.* xv. 455, *tt.* 15–16. Leaf unknown; peduncle about $1\frac{3}{4}$ in. long, enclosed by several cataphyllary leaves, the longest of which are about 3–$3\frac{3}{4}$ in. long. Spathe 12–16 in. long, and about 8 in. diam. across the top, funnel-shaped, obliquely truncate, slightly undulated at the margin. Spadix $3\frac{1}{2}$ in. long, about 1 in. thick, cylindric, obtuse, densely covered with unisexual flowers; female part about $1\frac{1}{4}$ in. long; male part contiguous to the female, densely covered with fertile anthers to the apex. Ovary oblong-ovoid, narrowed into a short thick style; stigma bilobed, not thicker than the style. Anthers free, subsessile, linear-oblong; connective produced into a transverse thickened minutely papillate knob.—Engl. & Prantl, Pflanzenfam. Nachtr. zu ii.–iv. 59. *P. gabonensis*, Durand & Schinz, Consp. Fl. Afr. v. 475.

Lower Guinea. Gaboon: Munda district; on the banks of Maveli River at Sibange Farm, *Soyaux*, 299.

I have not seen this plant.

7. **ANCHOMANES**, Schott; Benth. et Hook. f. Gen. Pl. iii. 973.

Spathe shortly convolute at the base, boat-shaped, at length deciduous. Spadix shorter than the spathe, free, monœcious, male and female parts contiguous, no neuter organs or appendix. Perianth none. Ovaries numerous, crowded, 1-celled; style deflexed or none; stigma small. Ovule solitary, basal, erect, anatropous. Stamens free; anthers

sessile, 4-celled ; connective thick, truncate; cells confluent in pairs at the apex, opening by terminal pores. Berry ovoid, 1-seeded. Ripe seeds not seen.—Tuberous-rooted herbs, producing flowers and leaves at the same or different times. Leaf solitary; petiole tall, prickly, 3-branched at the top; branches dichotomously divided, pinnatipartite; lateral leaf-segments lanceolate, ovate, or elliptic, acute, acuminate or cuspidate; terminal segments cuneate-oblong, bicuspidate at the apex. Peduncle solitary, tall, prickly (smooth in 5. *A. Boehmii*).

An endemic genus of 4 species. The leaf of *A. Boehmii* is unknown, and this species may prove not to belong to the genus *Anchomanes*.

Peduncle prickly ; spathe 5 in. to 3 ft. long.
- Ovary and style tubercled.
  - Spathe about 3 ft. long . . . . . 1. *A. giganteus.*
  - Spathe 5–9 in. long . . . . . 2. *A. Hookeri.*
- Ovary (and style when present) smooth.
  - Style $\frac{1}{2}$–1 lin. long . . . . . 3. *A. dubius.*
  - Style 0 ; stigma sessile . . . . . 4. *A. Welwitschii.*

Peduncle smooth ; spathe 1–$1\frac{1}{4}$ in. long . . . 5. *A. Boehmii.*

1. **A. giganteus,** *Engl. Jahrb.* xxvi. 419. Tuber very large. Leaf present at the time of flowering, about $3\frac{1}{2}$ ft. diam.; petiole attaining a height of 8 ft., prickly ; the 3 primary divisions of the leaf 2–3-pinnatisect, lowest segments subtripartite, following segments pinnatisect, with 2–3 pairs of leaflets, ultimate segments much larger and bipinnatisect ; lowest of the tertiary segments ovate-lanceolate, subacute ; middle pinnatipartite, with about 2 pairs of leaflets ; ultimate pinnatipartite, with about 3 pairs of leaflets. Leaflets obliquely oblong-lanceolate, decurrent on the rhachis. Peduncle 5–$5\frac{1}{2}$ ft. long, prickly. Spathe 3 ft. long, elongated-lanceolate, scarcely acuminate. Spadix sessile ; female part 3–4 in. long ; male part 6–8 in. long, $\frac{3}{4}$–$1\frac{1}{6}$ in. thick. Ovary shortly ovoid ; style tuberculate.—De Wild. & Durand, Contrib. Fl. Congo, i. fasc. 2, 64.

South Central. Congo Free State : Umanghi Island in the Congo, *Laurent.*

I have not seen this species.

2. **A. Hookeri,** *Schott in Oesterr. Bot. Wochenbl.* 1853, 314. Leaf solitary, $2\frac{1}{2}$–$5\frac{1}{2}$ ft. diam., armed with scattered prickles on the petiole and its divisions ; petiole terete, 3–6 ft. high, variegated with purplish and green ; three primary divisions pinnatisect at the base, once or twice dichotomously divided above ; terminal segments 6–9 in. long, 3–$4\frac{1}{2}$ in. broad, bicuspidate. Peduncle $1\frac{1}{2}$–3 ft. high, terete, prickly, coloured like the petiole. Spathe 5–9 in. long, $1\frac{3}{4}$–2 in. broad, oblong (boat-shaped), acute, shortly convolute at the base, purple inside and out, or the inside greenish suffused with purple. Spadix $1\frac{3}{4}$–$5\frac{1}{2}$ in. long, 4–6 lin. thick, cylindric, tapering towards the obtuse apex ; female part $\frac{3}{4}$–$1\frac{1}{2}$ in. long, purple. Ovary ovoid, tubercled ; style about 1 lin. long, deflexed, tuberculate. Anthers cream-coloured.—Schott, Gen. Aroid. t. 34, Synop. Aroid. 71, and Prod. Aroid. 134. *A. Hookeri,* var. *pallida,* Hook. Bot. Mag. t. 5394. *A. difformis,* Engl. in DC. Monogr. Phan. ii. 304, in Mitth. Deutsch. Schutzgeb. 1889, ii. 149, in

Engl. & Prantl, Pflanzenfam. ii. iii. 126, and in Pfl. Ost-Afr. B. 131; Durand & Schinz, Consp. Fl. Afr. v. 473 (excl. syn. *Amorphophallus difformis*). *Caladium petiolatum*, Hook. Bot. Mag. t. 3728. *Pythonium Hookeri*, Kunth, Enum. iii. 31; Hook. Niger Fl. 527.

Upper Guinea. Fernando Po, *Mann*, 107! and cultivated specimens from *Boultbee!* and *Mann!* Cameroons: Batanga, *Braun* (ex *Engler*), Malimba, *Braun* (ex *Engler*).

This species, so far as I have seen specimens, appears to be confined to the island of Fernando Po, and to differ from *A. dubius*, Schott, in its larger leaflets and tubercled ovaries. The Cameroons specimens are probably *A. dubius*.

3. **A. dubius,** *Schott, Prod. Aroid.* 135. Leaf solitary, 2–3½ ft. diam., produced after the flowers, armed with scattered prickles on the petiole and its divisions; petiole 3–5 ft. long, terete, dull green, with a white spot above each prickle; three primary divisions pinnatisect at the base, once or twice dichotomously divided above; terminal segments 4½–7 in. long, 1½–3 in. broad, bicuspidate. Peduncle 1½–2½ ft. (or more ?) long, prickly, dull green, marked with linear whitish spots. Spathe 6–12 in. long, 1⅓–3 in. broad, boat-shaped, acute, shortly convolute at the base, pale purplish on both sides or cream-coloured within. Spadix sessile, 4½–8½ in. long, about ½ in. thick, cylindric, obtuse; female part about 1 in. long, purple, the rest male. Ovary ovoid, smooth; style ½–1 lin. long, stout, deflexed, smooth. Anthers cream-coloured.—Masters in Gard. Chron. 1885, xxiii. 668–669, fig. 152; Engl. in DC. Monogr. Phan. ii. 305; Engl. Jahrb. i. 486, and Pfl. Ost-Afr. B. 131, C. 131; Engl. & Prantl, Pflanzenfam. ii. iii. 126; Durand & Schinz, Consp. Fl. Afr. v. 473; Rendle in Cat. Afr. Pl. Welw. ii. 87. (*A. Hookeri*, Henriques in Bolet. Soc. Brot. xvi. 39, probably belongs here.) *Sauromatum ferox*, Linden, Cat. 1856, 16. *Amorphophallus difformis*, Blume, Rumphia, i. 149; Hook. Niger Fl. 527. *Cyrtosperma ? congoensis*, L. Lind. Semaine Hort. 1900, 473, fig. 158.

Upper Guinea. Sierra Leone: near Kambia, *Scott-Elliot*, 4383! near Buyabuya, *Scott-Elliot*, 4575! and without precise locality, *Afzelius!* Liberia, *cultivated specimens!* Gold Coast, *Burton & Cameron!* Ashanti; Assin-Yan-Coomassie, *Cummins*, 211! Niger Territory: Nupe, *Barter*, 502 partly! Wari (Oware), *Beauvois*. Old Calabar, *Holland*, 21!

Nile Land. British East Africa: Jur; Genana, near Jur Ghattas, *Schweinfurth*, 1790! 1347 (ex *Engler*).

Lower Guinea. Gaboon, *Bellay*, 273 (ex *Engler*). Congo, *Smith!* Angola: Golungo Alto; near Sange, at the spring of Capopa, and by the River Luina, in the Sierra de alta Queta, 2000 ft., *Welwitsch*, 224! in wooded mountainous places near the banks of rivulets around Sange, Bango Aquitamba, and Trombeta, *Welwitsch*, 225 partly (ex *Rendle*); Cazengo; in rocky wooded places on the banks of the River Luinha, *Welwitsch*, 223 (ex *Rendle*); Pungo Andongo; in rocky places of Mata de Pungo, near Pungo Andongo, *Welwitsch*, 1018 (ex *Rendle*), and without precise locality, *Monteiro!*

4. **A. Welwitschii,** *Rendle in Cat. Afr. Pl. Welw.* ii. 88. Leaf very similar to that of *A. dubius*, and of about the same size, produced

after the flowers. Peduncle of the specimens seen 9½–17 in. long, prickly. Spathe 5–6 in. long, shortly convolute at the base, boat-shaped, oblong-lanceolate, acute, sulphur-yellow, spotted with red inside. Spadix about half as long as the spathe; female part 14–15 lin. long; male 1½–2¼ in. long. Ovary cylindric-oblong or ovoid, with a hardened disk-like apex and sessile stigma, smooth, greenish.

Lower Guinea. Angola: Ambaca; between Isanga and Ambaca, *Welwitsch*, 225/5! Pungo Andongo; in the wooded thickets of Mata de Pungo, *Welwitsch*, 226!

This differs from *A. dubius*, Schott, which it otherwise much resembles, by its sessile stigma and yellow spathe.

5. **A. Boehmii,** *Engl. Jahrb.* xv. 454, *t.* 14, *figs. a–h.* Leaf unknown. Peduncle 8–10 in. long, smooth. Spathe 1–1¼ in. long, ovate-lanceolate, boat-shaped, acute. Spadix ¾–1 in. long, 2–2½ lin. thick, cylindric, obtuse; female part 3½ lin. long. Ovary turbinate; apex dilated and convex; stigma small, sessile.—Engl. Pfl. Ost-Afr. C. 131; Durand & Schinz, Consp. Fl. Afr. v. 473.

Mozamb. Dist. German East Africa: Unyamwezi; Pori, near Gonda, in Ugunda district, *Böhm*, 282.

I have not seen this species.

8. **COLOCASIA,** Schott; Benth. et Hook. f. Gen. Pl. iii. 974.

Spathe convolute below, constricted at the base of the limb; tube persistent in fruit; limb deciduous. Spadix shorter than the spathe, free, monœcious, terminating in a naked appendage (which is sometimes obsolete in cultivated plants); female part contiguous with the barren basal part of the male inflorescence. Perianth none. Female flowers numerous, with a few neuter organs (pistillodes) intermixed with them: ovaries free, 1-celled; stigma sessile or subsessile, discoid or cushion-like; ovules numerous, biseriately affixed along 3–5 parietal placentas, obliquely orthotropous, with long funicles. Male flowers with 3–5 anthers connate into a sessile angular truncate body; anther-cells opening by terminal pores. Berries enclosed in the tube of the spathe, which finally ruptures, obovoid, subtruncate, 1-celled, many-seeded. Seeds narrowly ovoid, small; testa thickened, ribbed; albumen copious; embryo axile at the apex of the albumen.—Herbs with a tuberous rootstock. Leaves all radical, with long petioles, peltate, ovate, cordate or obtusely sagittate at the base, reticulately veined between the primary veins. Peduncles solitary or 2 or more from the same axil.

A small genus of about 7 species, natives of Tropical Asia and the Malay Archipelago. The following has been introduced and become naturalised in some parts of Africa.

1. **C. Antiquorum,** *Schott, Melet.* 18. Rootstock thick, fleshy. Leaves all radical, erect, glabrous; petiole 1–3½ ft. long; blade ¾–2ft. long, 5–15 in. broad, peltate, ovate, rather abruptly acute, cordate-sagittate at the base; basal lobes 1–4 in. long, deltoid, very obtuse. Peduncle 5–18 in. long, solitary or 2 or more from the same axil.

Spathe 6–17 in. long; tube ovoid-oblong, green; limb narrowly lanceolate, 2–5 times as long as the tube, convolute to an acute point at the apex apricot-yellow. Spadix shorter than the spathe; female part $\frac{3}{4}$–2 in. long, cylindric, tapering towards the top; male part, including the portion covered with barren organs (staminodes) at its base, 2–4 in. long, cylindric, constricted at the base; appendix variable irrespective of the rest of the spadix, $\frac{1}{6}$–$2\frac{1}{2}$ in. long, more slender than the male part, terete, tapering to an acute point, buff-coloured. Ovaries mixed with neuter organs (abortive ovaries), obovoid; stigma sessile, discoid. Anthers buff-coloured.—Synop. Aroid. 40, Gen. Aroid. t. 37, and Prod. Aroid. 138; Kunth, Enum. iii. 37; Thomson in Speke, Nile, Append. 651; Engl. in DC. Monogr. Phan. ii. 491, in Pflanzenw. Ost-Afr. B. 131, C. 132, and in Mitth. Deutsch. Schutzgeb. ii. (1889), 150; Hook. f. Fl. Brit. Ind. vi. 523, and in Bot. Mag. t. 7364; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 52, 105; Henriques in Bolet. Soc. Brot. xiii. 134; Dewèvre in Comptes-rendus Soc. bot. Belg. xxxiii. 107; Rendle in Cat. Afr. Pl. Welw. ii. 88; Durand & Schinz, Consp. Fl. Afr. v. 478. *Colocasia sp.*, Hook. Niger Fl. 527. *Caladium esculentum*, Schumach. & Thonn. Beskr. Guin. Pl. 408.

Upper Guinea. Cape Verd Islands; St. Antao, *Lowe!* Cape Verde, *Cardoso* (ex *Henriques*). Sierra Leone, cultivated, *Don!* Guinea, *Thonning*. Cameroons: Barombi, *Preuss*, 300!

Nile Land. Eritrea: near the Otal water place, on the northern slope of the Highlands of Dembelas, *Schweinfurth*, 121, and near Filfil, *Schweinfurth*, 122 (ex *Schweinfurth*). Abyssinia, Kordofan, Sennar, and Uganda (ex *Durand & Schinz*), British East Africa: Uganda and Unyoro (ex *Speke & Grant*); Rabai Hills, near Mombasa, *Taylor!*

Lower Guinea. Angola: Golungo Alto: in shady woods by the sides of streams in the Sierra de Alto Queta, rarely flowering, *Welwitsch*, 220! in woods between Sange and Menha Lula, *Welwitsch*, 220/2. Cazengo; in lofty shady places on the Sierra de Muchaula, *Welwitsch*, 220/3! Pungo Andongo; in woods by streams in Mata de Pungo, on the Præsidium, *Welwitsch*, 221.

Mozamb. Dist. British Central Africa: Nyasaland; Blantyre, *Descamps* (ex *Dewèvre*).

Introduced. A native of Tropical Asia and the Malay Archipelago.

9. CALADIUM, Vent.; Benth. et Hook. f. Gen. Pl. ii. 976.

Spathe convolute below; constricted at the base of the boat-shaped limb; tube persistent and eventually rupturing in fruit; limb deciduous. Spadix shorter than the spathe, free, monœcious, without an appendix; female part contiguous with the barren basal part of the male inflorescence. Perianth none. Female flowers numerous; ovaries all slightly connected just below the apex, 2- (rarely 3–4-) celled; stigma sessile; ovules numerous, axile, anatropous. Male flowers: Anthers 3–5, connate into a sessile angular truncate body, the cells not reaching to the top, opening by terminal pores. Berries enclosed in the tube of the spathe, obovoid or pear-shaped, 2–3-celled, many-seeded. Seeds ovoid, small; testa thick; albumen copious; embryo-

axile.—Herbs with a tuberous rootstock. Leaves all radical, with long petioles, sagittate, cordate, or lanceolate, usually peltate, reticulately veined. Peduncle solitary, long.

Species several, natives of Tropical America, the following has been introduced into Tropical Africa, and become naturalised.

1. **C. bicolor,** *Vent. Descr. Pl. Nouv. Jard. Cels*, 30. Tuber depressed-globose. Leaves few, erect; petiole ½–1 ft. long, terete, glabrous, glaucous towards the apex; blade 6–10 in. long, 4–7 in. broad, peltate, ovate-sagittate, acute, glabrous, crimson or whitish in the central part, glaucous beneath; basal lobes deltoid, obtuse, with an open obtuse sinus between them. Peduncle 8–10 in. long, terete, glabrous. Spathe glabrous; tube 1–1½ in. long, ovoid, green; limb 1¾–2½ in. long, about 1 in. broad, boat-shaped, convolute-cuspidate, white, deciduous. Spadix a little shorter than the spathe; female part cylindric; male part fusiform, obtuse.—Kunth, Enum. iii. 42; Bot. Mag. t. 2543; Lodd. Bot. Cat. t. 255; Hook. Exot. Fl. i. t. 26; Schott, Syn. Aroid. 54, and Prod. Aroid. 172; Engl. in DC. Monogr. Phan. ii. 457; Henriques in Bolet. Soc. Brot. v. 208; Rendle in Cat. Afr. Pl. Welw. ii. 89. *Arum bicolor*, Ait. Hort. Kew. ed. i. iii. 316; Bot. Mag. t. 820; Jacq. Hort. Schœnbr. ii. 30, t. 186.

Lower Guinea. Island of St. Thomas: very common, *Moller* (ex *Henriques*), *Welwitsch*, 6769! Princes Island: common in all the cultivated ravines, *Barter*, 1945! at the base of Pico de Papagaio, 1600–2000 ft., *Welwitsch*, 222! and without precise locality, *Mann*, 1150! West Africa, *Grey!*

Introduced. A native of Tropical America.

10. **TYPHONODORUM**, Schott; Benth. et Hook. f. Gen. Pl. iii. 977.

Spathe convolute below, constricted at the mouth of the tube; limb elongated, acuminate, concave. Spadix shorter than the spathe, free, monœcious; female part short, cylindric, separated from the male part by a constricted interval covered with barren organs (pistillodes); fertile male part not very long, cylindric, passing upwards into a very long cylindric spike of staminodes. Perianth none. Ovary 1-celled; stigma subsessile. Ovule solitary, basal, erect, anatropous. Male flowers of 4–8 anthers united into a truncate angular body; anther-cells opening by short terminal slits. Barren organs, both pistillodes and staminodes, elongated in the direction of the axis, irregularly angular, truncate, crowded. Berries very large, containing 1 large nut-like seed.—Large herbs several ft. in height, with the habit of *Richardia*. Leaves all radical, cordate, with long stout petioles. Peduncle long and stout. Spathe very long.

A specimen, which was collected in the Island of Zanzibar by Stuhlmann, has been referred by Engler (Pfl. Ost-Afr. C. 132) to this genus, but is stated to be in too imperfect a condition to admit of its specific identification. The only other known species (for *T. madagascariense*, Engl., is the same as *T. lindleyanum*, Schott) is a native of the Mascarene Islands.

11. **RICHARDIA,** Kunth; Benth. et Hook. f. Gen. Pl. iii. 982.

Spathe convolute in the lower half, funnel-shaped, persistent; limb oblique, open, suberect or recurving, terminating in a subulate point. Spadix monœcious, free, sessile or stipitate, much shorter than the spathe; male and female parts contiguous; appendix none; staminodes are sometimes mixed with the ovaries, but there are no other barren organs. Perianth none. Ovaries numerous, crowded, subglobose, angular from mutual pressure, 2–3-celled; style short or almost none; stigma discoid. Ovules 2–4 in each cell, on axile placentas, anatropous. Anthers sessile, crowded, oblong, compressed, truncate at the apex, 2-celled, cells opening by terminal pores. Berry broadly obovoid or subglobose, 1–3-celled; cells 1–2-seeded. Seed subglobose or ovoid, slightly angular; testa rather thin; albumen copious; embryo axile. Herbs with a thick fleshy rhizome. Leaves contemporary with the flowers, all radical, with long petioles, and hastate, sagittate, cordate or lanceolate blades. Peduncles solitary, as long as or longer than the leaves. Spathe large, showy, white, yellow, or rosy, persisting and changing to green as the fruit develops.

A small genus confined to Tropical and South Africa.

Leaves spotted.

Leaves ovate-cordate or orbicular-cordate; spathe without a purple-brown blotch at the base . . 1. *R. elliottiana.*

Leaves hastate; spathe with a dark purple-brown blotch at the base . . . . . 2. *R. melanoleuca.*

Leaves without spots; spathes with a dark purple-brown blotch at the base (see also the young state of 2, *R. melanoleuca*).

Leaf with the ovate-deltoid part above the basal-lobes nearly twice as long as broad; spathe light yellow . . . . . 3. *R. hastata.*

Leaf with the elongated-deltoid or elongated-oblong part above the basal-lobes 2–5 times as long as broad; spathe deep golden-yellow . . . 4. *R. angustiloba.*

1. **R. elliottiana,** *W. Wats. in Garden and Forest,* 1892, 330. Leaves glabrous; petiole 2 ft. or more long, smooth, without bristles; blade bright green, marked with numerous transparent white elongated spots, 9–11 in. long, 6–10 in. broad, ovate or orbicular-ovate, obtuse, with a subulate point at the apex, cordate at the base; basal lobes very broadly rounded; sinus about 2 in. deep. Peduncle longer than the leaves, smooth, green. Spathe 5–6 in. long, bright golden-yellow, without a purple blotch at the base inside; tube funnel-shaped; limb oblique, subhorizontally spreading, obtuse, with a subulate point. Spadix about half as long as the spathe, cylindric, obtuse. Ovaries subglobose, angular from mutual pressure, pale greenish; stigma sessile, discoid. Staminodes none. Anthers orange-yellow. Berries large, about $\frac{3}{4}$ in. diam., obovoid or subglobose, green.—Duren in Rev. Hort. Belge, 1897, 13, with pl.; Bot Mag. t. 7577. *Calla elliottiana,* Knight

in Journ. Roy. Hort. Soc. 1890, xii., Proc. lviii.; W. Wats. in Gard. Chron. 1892, xii. 124.

Mozamb. Dist. Tropical Transvaal? *cultivated specimens!*

This species is stated to have been raised from seeds received from South Africa, but I have reason to believe that its habitat is somewhere in the northern part of the Transvaal.

2. **R. melanoleuca,** *Hook. f.*, var. **tropicalis,** *N. E. Br.* Leaves glabrous; petiole $\frac{3}{4}$–$2\frac{1}{2}$ ft. long, smooth, without the soft bristles at the base that are characteristic of the type; blade 8–14 in. long, $4\frac{1}{2}$–14 in. broad across the basal lobes, hastate or somewhat sagittate in the smaller leaves, acute, green, marked with transparent white linear spots; basal lobes spreading, obtuse. Peduncle longer than the leaves, smooth. Spathe 3–$5\frac{1}{2}$ in. long, lemon-yellow, with a crimson blotch at the base inside; tube funnel-shaped; limb oblique, tapering into a subulate point. Spadix shortly stipitate, not half as long as the spathe, cylindric, obtuse. Ovary subglobose, green; style $\frac{1}{3}$–$\frac{1}{2}$ lin. long; stigma small. Staminodes none, or confined to a very few of the uppermost female flowers.

Mozamb. Dist. British Central Africa: Nyasaland; Namasi, *Cameron!* Mashonaland; at Six-mile Spruit near Salisbury, *Hon. Mrs. Evelyn Cecil,* 149!

In the young state the leaves of this variety are elongate-ovate, acute, cordate-sagittate at the base, and green without any spots, the spots developing with the age of the plant.

This differs from the typical South African form by its larger size, and by the absence of the soft bristles at the base of the petioles so characteristic of the Natal plant. The stigma is not always subsessile in typical *R. melanoleuca,* Hook. f., as I had previously described, some specimens having a distinct style about $\frac{1}{3}$ lin. long.

3. **R. hastata,** *Hook. f. in Bot. Mag. t.* 5176. Leaves with petioles 1–$1\frac{1}{2}$ ft. long, having soft bristle-like hairs on the lower part, which wither and often nearly disappear in the dried state; blade green, without spots, $8\frac{1}{2}$–$13\frac{1}{2}$ in. long, 4–$7\frac{1}{2}$ in. broad across the basal lobes, triangular-sagittate or hastate, acute, the part above the basal lobes usually less than twice as long as broad; basal lobes very broadly ovate or rounded, very obtuse, overlapping one another at the sinus, or spreading. Peduncle about a foot long, smooth. Spathe 3–4 in. long, light yellow, tinted with green outside, marked with a large purple-brown blotch at the base inside; tube funnel-shaped; limb obliquely truncate at the mouth, abruptly subulate-pointed. Spadix about half as long as the spathe, cylindric, obtuse. Ovary angular-globose, light green; style very short, conical; stigma small. Staminodes none. Anthers yellow.—Schott, Prod. Aroid. 325; Engl. in DC. Monogr. Phan. ii. 328; Garden, Dec. 11, 1880; N. E. Br. in Dyer, Fl. Cap. vii. 38. *R. Lutwychei,* N. E. Br. in Gard. Chron. 1893, xiii. 568; Rev. Hort. 1896, 60 with pl. *R.* "*Pride of Congo,*" Rev. Hort. 1893, 27. *Calla oculata,* Lindl. in Gard. Chron. 1859, 788. *Zantedeschia hastata,* Engl. Jahrb. iv. 64; Durand & Schinz, Consp. Fl. Afr. v. 477 partly. *Z. Lut-*

wychei, Durand & Schinz, Consp. Fl. Afr. v. 477; Engl. Pfl. Ost-Afr. C. 132. *Arodes hastatum*, O. Kuntze, Rev. Gen. Pl. ii. 740.

Central Africa. Stated to have been imported from the "neighbourhood of Lake Nyanza" (Lake Nyasa ?), *cultivated specimen !*

Also in South Africa.

The differences of the overlapping basal lobes of the leaf, and the presence of bristles on the petiole, by which I originally distinguished *R. Lutwychei* from *R. hastata*, I find to be inconstant; with regard to the bristles on the petioles of *R. hastata* they are either sometimes absent, or disappear in the process of drying.

4. **R. angustiloba,** *Schott in Journ. Bot.* 1865, 35. Leaves glabrous; petiole smooth, without bristles; blade $7\frac{1}{2}$–17 in. long, 4–11 in. broad across the basal lobes, hastate, green, without spots; the part above the basal lobes elongate-deltoid or elongate-oblong, often very narrow, acute or acuminate, 2–5 times as long as broad; basal lobes very variable, short or long, sometimes very spreading, sinus very open. Peduncle about as long as the leaves, smooth. Spathe 4–$4\frac{1}{2}$ in. long, clear deep gamboge-yellow, with a dark purple-brown blotch at the base inside, "intense sulphur-coloured, blood-red at the base inside" (*Welwitsch*), paler outside; tube funnel-shaped; limb oblique, subhorizontal, acute. Spadix shortly stipitate, scarcely half as long as the spathe, cylindric, obtuse. Ovary subglobose, pale greenish-white; style short; stigma small, discoid. Staminodes none. Anthers yellow. Berries large, subglobose or obovoid.—Engl. in DC. Monogr. Phan. ii. 329; N. E. Br. in Dyer, Fl. Cap. vii. 37. *R. hastata*, Engl. in DC. Monogr. Phan. ii. 328, as to the Angolan plant. *R. macrocarpa*, W. Wats. in Gard. Chron. 1892, xii. 124. *R. Pentlandii*, Whyte ex W. Wats. in Gard. Chron. 1894, xv. 590; Bot. Mag. t. 7397. *Calla Pentlandii*, Whyte ex W. Wats. in Gard. Chron. 1892, xii. 124. *Zantedeschia angustiloba*, Engl., and *Z. macrocarpa*, Engl. Jahrb. iv. 64; Durand & Schinz, Consp. Fl. Afr. v. 477. *Arodes angustilobum*, O. Kuntze, Rev. Gen. Pl. ii. 740. *Aroides hastatum*, Rendle, and *A. angustilobum*, Rendle in Cat. Afr. Pl. Welw. ii. 90–91.

Lower Guinea. Angola: Pungo Andongo; frequent in deep stagnant places between the islands Calemba and Quisonde, on the right bank of the River Cuanza, 2040–3800 ft., *Welwitsch*, 230 ! 1020 (ex *Rendle*); Huilla; near Lopollo, frequent in swamps near rivers, 5000 ft., *Welwitsch*, 232 ! 232/2 ! in spongy places at the great lake of Ivantala, *Welwitsch*, 232/3 !

R. nilotica, mentioned by W. Wats. in Garden and Forest, 1892, 618, with white and red spathes, and said to have been "collected on the banks of the Nile" is probably *R. Rehmanni*, N. E. Br., a native of Natal, but which, probably, also grows in the Transvaal, and perhaps the "banks of the Nile" may be a misinterpretation of Nylstroom or Nyl River in the Transvaal.

12. NEPHTHYTIS, Schott; Benth. et Hook. f. Gen. Pl. iii. 982.

Spathe expanded, not convolute, decurrent on the peduncle at the base, persistent. Spadix free, monœcious, shorter than the spathe, without an appendix or neuter organs; male and female parts contiguous. Perianth none. Ovaries crowded, 1-celled; stigma sessile, discoid or

nipple-like. Ovule solitary, basal, erect, anatropous. Anthers sessile, crowded, cuneate-oblong, truncate, 2-celled; cells separated by a thick connective, opening by apical pores. Berries obovoid or ellipsoid, 1-seeded. Seed ellipsoid or obovoid erect, testa very thin; albumen copious; embryo very small, seated at the base of the albumen.—Herbs with a stout creeping rhizome. Leaves few, with long erect petioles, sagittate or hastate, reticulately veined. Peduncles 1 or 2, from the apex of the rhizome, about as long as the petioles, erect. Spathe green.—*Oligogynium*, Engl. Jahrb. iv. 64, xv. 452; Engl. & Prantl, Pflanzenfam. ii. iii. 129.

Species 4, endemic.

Engler, in his Bot. Jahrb. xv. 451, has correctly pointed out that the description I gave in the Gardeners' Chronicle, 1881, xv. 790, of the position of the ovules of *Nephthytis*, is erroneous. My original sketch of the ovary of *N. liberica*, which I now find to be the same as *N. Afzelii*, Schott, represents the ovule pendulous from near the apex of the ovary, as described, but whether this drawing truly represents an abnormal ovary, or is the result of an error of observation on my part, I am unable to say, but I suspect the latter. For it is quite certain that the normal position of the ovule in *Nephthytis* is erect from the base of the ovary, since I have never found another ovary with a pendulous ovule. Schott, who founded the genus *Nephthytis* upon a fruiting specimen of *N. Afzelii*, apparently fell into the same error with regard to the position of the seed of the plant he examined, since I find the ovule of *N. Afzelii* to be basal or sub-basal and erect, and there is not the slightest reason for maintaining *Oligogynium*, Engl., as in any way distinct from *Nephthytis*.

Since the above was written, Engler (in Engler & Prantl, Pflanzenfam. Nachtr. zu ii.–iv. 60) has expressed the same opinion.

Leaves very much constricted above the basal-lobes, sagittately 3-lobed; spadix subsessile or with a stipes not more than 1 lin. long	1. *N. constricta.*
Leaves slightly or not at all constricted above the basal lobes.	
Spadix stipitate; stigma small on a short nipple-like style	2. *N. Poissoni.*
Spadix sessile; stigma large, discoid, sessile . .	3. *N. Afzelii.*

1. **N. constricta,** *N. E. Br. in Gard. Chron.* 1881, xv. 790. Rhizome creeping, about ½ in. thick. Leaves 2–3 at the apex of the rhizome, erect, glabrous; petiole 1–2 ft. long, 1–2 lin. thick; blade sagittate, 3-lobed or very much constricted above the basal lobes; front lobe 4–7 in. long, 1¾–3¾ in. broad, oblong or ovate-oblong, acuminate; basal lobes 6–8½ in. long, 1¾–3½ in. broad, obliquely lanceolate or oblong-lanceolate, acuminate into a long point; nerves of the basal lobes denuded for 5–10 lin. in the narrow parabolic sinus. Peduncle 4½–15 in. long, rather slender, glabrous. Spathe 1½–2 in. long, oblong, subulate-acuminate, decurrent on the peduncle for 5–6 lin. at the base, expanded, with revolute margins, widely spreading, green. Spadix subsessile or with a stipes not more than 1 lin. long, ¾–1 in. long, about 2 lin. thick. Ovary globose; style short, nipple-like, hardened in the dried state; stigma very small.—*Oligogynum constrictum*, Engl. Jahrb. xv. 453; Durand & Schinz, Consp. Fl. Afr. v. 476.

Upper Guinea. Cameroons: Rio del Rey, *Johnston!* Batanga, *Braun* (ex *Engler*); and without precise locality, *Bucholz*, 93! Fernando Po, *Mann*, 106!

The stigma is not broadly discoid as stated by Engler in Engl. Jahrb. xv. 452.

2. **N. Poissoni,** *N. E. Br.* Rhizome $\frac{1}{3}$–$\frac{1}{2}$ in. thick. Leaves 2–3 at the apex of the rhizome, erect, glabrous; petiole 10–14 in. long; blade deltoid or ovate-deltoid, sagittate, slightly or not at all constricted above the basal lobes; front lobe 4–5$\frac{1}{2}$ in. long, 3–6$\frac{1}{2}$ in. broad, deltoid, somewhat abruptly cuspidate-acuminate at the apex; basal lobes 4$\frac{1}{2}$–7$\frac{1}{2}$ in. long, 2–2$\frac{3}{4}$ in. broad, oblong-ovate or oblong-lanceolate, gradually or rather abruptly tapering into long narrow acuminate tips. Peduncle 5–15 in. long. Spathe 1$\frac{1}{2}$–2$\frac{1}{2}$ in. long, $\frac{3}{4}$–1$\frac{1}{4}$ in. broad, oblong or elliptic-oblong, obtuse, subulate-apiculate, decurrent at the base, more or less spreading (reflexed according to *Engler*). Spadix stipitate; stipes 3–7 lin. long. Ovary subglobose; style short, nipple-like in the dried state; stigma small, $\frac{1}{2}$ lin. diam. or less, not discoid.—*Oligogynium Poissoni*, Engl. Jahrb. iv. 65, xv. 453, Ic. Araceæ, 28, and in Mitth. Deutsch. Schutzgeb. ii. 1889, 150; Engl. & Prantl, Pflanzenfam. ii. iii. 129; Durand & Schinz, Consp. Fl. Afr. v. 476. *O. Gravenreuthii*, Engl. Jahrb. xv. 453; Durand & Schinz, Conspect. Fl. Afr. v. 476.

Upper Guinea. Cameroons: Bipinde, in the forest region, *Zenker*, 2055! Barombi, *Preuss*, 299! Batanga, *Braun* (ex *Engler*).

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 150! and 455 (ex *Engler*).

According to Engler the stigma is discoid and somewhat broader than the style, but I do not find it so in the specimens I have seen.

3. **N. Afzelii,** *Schott in Oesterr. Bot. Wochenbl.* 1857, 406. Rhizome $\frac{1}{2}$–$\frac{3}{4}$ in. thick. Leaves 2–3, at the apex of the rhizome, erect, glabrous; petiole 7–20 in. long, 1–2 lin. thick, terete, green; blade sagittate, forming nearly an equilateral triangle in outline, occasionally slightly constricted above the basal lobes; front lobe (from insertion of petiole) 2$\frac{1}{2}$–10 in. long, 3–7 in. broad, acute or very shortly cuspidate; basal lobes 2$\frac{3}{4}$–6$\frac{1}{2}$ in. long, 1$\frac{1}{2}$–4 in. broad, oblong-ovate or elliptic-oblong, somewhat abruptly acuminate; basal nerves denuded for 3–8 lin. in the parabolic sinus. Peduncle 9–18 in. long, terete, green. Spathe 2–2$\frac{1}{2}$ in. long, 1–1$\frac{1}{4}$ in. broad, oblong or ovate-oblong, obtuse, apiculate, decurrent for 4–6 lin. at the base, expanded, spreading, green. Spadix sessile, $\frac{1}{4}$–1$\frac{3}{4}$ in. long, about $\frac{1}{4}$ in. thick, cylindric, obtuse; male part about twice as long as the female. Ovary subglobose; stigma sessile, large, discoid, $\frac{3}{4}$–1 lin. diam. Berries about $\frac{1}{2}$ in. long, 4 lin. thick, slightly obovoid, bright orange-yellow.—Schott, Gen. Aroid. t. 51, and Prod. Aroid. 218; Engl. in DC. Monogr. Phan. ii. 302; Engl. & Prantl, Pflanzenfam. Nachtr. zu ii.–iv. 60; Durand & Schinz, Conspect. Fl. Afr. v. 475. *N. liberica*, N. E. Br. in Gard. Chron. 1881, xv. 790. *Oligogynium libericum*, Engl. Jahrb. xv. 453; Durand & Schinz, Consp. Fl. Afr. v. 476.

Upper Guinea. Sierra Leone, *Afzelius* (ex *Schott*), *Smeathman!* Liberia: Monrovia, *Naumann* (ex *Engler*); *cultivated specimens!*

Introduced into cultivation by Mr. W. Bull in 1881.

13. **RHEKTOPHYLLUM**, N. E. Br.; Benth. et Hook. f. Gen. Pl. iii. 981.

Spathe closely convolute and cylindric in the lower part; limb deeply concave, oblong subacute. Spadix monœcious, free, sessile, densely covered with flowers, without an appendix or neuter organs; male and female parts contiguous. Perianth none. Ovaries subglobose or angular from mutual pressure, one-celled; stigma sessile or subsessile, discoid. Ovule solitary, anatropous, affixed near the base or towards the middle of a projecting parietal placenta. Anthers free, sessile, cuneate-oblong, truncate; cells parallel, linear, opening by terminal pores.—A stout climber. Leaves with long petioles, perforated between the primary nerves, reticulately veined. Peduncles 2–4 together, terminal.

An endemic, monotypic genus.

1. **R. mirabile,** *N. E. Br. in Journ. Bot.* 1882, 195, *t.* 230. Stem about an inch thick, climbing to a height of 30 ft., rooting. Leaves glabrous; petiole ¾–2 ft. long, terete, grooved at the base in the adult stage, shortly sheathing; blade 6–18 in. long, 5–14 in. broad across the basal lobes, hastate or cordate-hastate, cuspidate-acuminate or shortly and rather abruptly acute, more or less sinuate along the margins, in young plants or young shoots entire, dark green, variegated with whitish between the primary veins in a pattern resembling the tips of a fern frond; in adult plants with large slit-like perforations between the primary veins on each side of the midrib, green, without variegation; front lobe ovate or oblong-ovate; basal lobes broadly rhombic-ovate, or somewhat hatchet-shaped, very obtuse, with a broad, open, very obtuse sinus between them; primary lateral veins 3–4 on each side of the midrib, stout, distant; basal nerve with 2–4 branches, denuded for 1–1½ in. in the sinus. Peduncles terminal, 2–4 together, 1½–2 in. long, stout. Spathe 4 in. long, fleshy, green. Spadix a little shorter than the spathe, about ½ in. thick. Berries red, not seen.—Engl. & Prantl, Pflanzenfam. ii. iii. 128; Engl. Jahrb. xv. 450, and in Mitth. Deutsch. Schutzgeb. ii. 1889, 150; Durand & Schinz, Consp. Fl. Afr. v. 475, and Études Fl. Congo, i. 276; De Wild. & Durand, Contrib. Fl. Congo, i., fasc. 2, 65. *Nephthytis picturata,* N. E. Br. in Gard. Chron. 1887, i. 476; Durand & Schinz, Études Fl. Congo, i. 277.

Upper Guinea. Niger Territory; Old Calabar, creeping on the ground, and climbing on trees, *Monteiro!* Cameroons; Rio del Rey, *Johnston,* 2! in forest west of Barombi-ba-Mbu, *Preuss,* 473 (ex *Engler*), Batanga, *Braun* (ex *Engler*). Fernando Po, *Barter! Mann,* 101!

Lower Guinea. Congo, *cultivated specimens!*

South Central. Congo Free State: Monbuttu; in forest at Mbala stream north of the River Kibali, *Schweinfurth,* 3621 (ex *Engler*); Bamanga, *Laurent* (ex *De Wildeman & Durand*).

A plant of *Nephthytis picturata,* cultivated at Kew, having developed a climbing

habit and put forth the adult form of leaf, demonstrates that it is merely the juvenile state of *Rhektophyllum mirabile*, which with increasing age loses its remarkable variegation and develops the large slit-like perforations between the lateral veins of the leaves so characteristic of the latter plant.

14. **CULCASIA,** Beauv.; Benth. et Hook. f. Gen. Pl. iii. 980.

Spathe convolute to half way up or at the base only, after flowering convolute to the apex and persistent for a while, or at once falling off. Spadix longer or shorter than the spathe, free, monœcious, without an appendix; male and female parts contiguous; lowest stamens often abortive. Perianth none. Ovaries crowded or scattered, 1–2-celled; stigma sessile, discoid or cushion-like, large or small. Ovules solitary in each cell, basal, anatropous. Anthers free, sessile, crowded, trigonous or angular, 2-celled; cells oblong, parallel, opening by a small pore just below the apex. Berries globose or ellipsoid, 1-2-seeded. Seed ellipsoid; testa very thin; albumen copious; embryo very small, seated in a cavity at the base of the albumen.—Stems climbing or erect, rooting. Leaves alternate, petiolate, entire, reticulately veined, usually with immersed linear or dot-like glands, and often with sessile superficial glands; petiole sheathing. Peduncles terminal, 2-several fascicled or in a short raceme, or solitary.

An endemic genus of about 14 species.

*Stem climbing or creeping.
- Spadix longer than the spathe.
  - Leaves obliquely oblong, oblong-lanceolate or elliptic-oblong, seldom less than $1\frac{3}{4}$ in. broad; spathe $1\frac{1}{4}$–$1\frac{3}{4}$ in. long . . . . . 1. *C. scandens.*
  - Leaves narrowly lanceolate, $\frac{2}{3}$–1 in. broad; spathe $\frac{3}{4}$–1 in. long . . . . . 2. *C. lancifolia.*
- Spadix shorter than the spathe.
  - Leaves acute or obtuse at the base, but not cordate.
    - Leaves tapering to a long acuminate point.
      - Leaves obliquely lanceolate, $2\frac{1}{2}$–$5\frac{3}{4}$ in. long.
        - Peduncle $1\frac{3}{4}$–2 in. long; spathe about $1\frac{1}{4}$ in. long . . . . . 3. *C. insulana.*
        - Peduncle about 4 in. long; spathe $1\frac{3}{4}$ in. long . . . . . 4. *C. falcifolia.*
        - Peduncle about 5 lin. long; spathe 7 lin. long . . . . . 5. *C. lanceolata.*
      - Leaves oblong-elliptic, 4–12 in. long; peduncles 3–4 together, $\frac{3}{4}$–$1\frac{1}{4}$ in. long; spathe 2 in. long . . . . . 7. *C. tenuifolia.*
    - Leaves shortly excavated at the apex; berries very large . . . . . 8. *C. Dinklagei.*
  - Leaves rather abruptly short-pointed (apex not described in 9, *C. obliquifolia*).
    - Leaves obliquely-oblong, acute at the base, 4 in. or more broad; peduncles 2 in. long 9. *C. obliquifolia.*
    - Leaves obliquely-oblong, obtuse at the base, 2–$3\frac{1}{2}$ in. broad; peduncles 1–$1\frac{1}{4}$ in. long 10. *C. barombensis.*

Leaves elliptic or elliptic-oblong, very obtuse at the base, 4–7½ in. broad; peduncles 2¼–3½ in. long	11. *C. angolensis.*
Leaves distinctly cordate at the base; spathe 6–8 lin. long	6. *C. parviflora.*

**Stem erect, 1–3 ft. high, with long stilt-like roots.

Leaves 3–5 in. broad, elliptic, subacute	12. *C. Mannii.*
Leaves 1¼–2¾ in. broad, oblanceolate or oblanceolate-oblong, acuminate	13. *C. striolata.*
Leaves ¾–1 in. broad, lanceolate, acute or acuminate	14. *C. gracilis.*

1. **C. scandens,** *Beauv. Fl. Owar.* i. 4, *t.* 3. Stem climbing, 1½–2½ lin. thick, minutely tubercled, glabrous. Leaves ¾–3 in. distant, spreading, glabrous; petiole 1–3 in. long, sheathing up to 1–6 lin. from the top; blade 3–7 in. long, 1¼–3¼ in. broad, varying from lanceolate to elliptic, more or less oblique, shortly and somewhat abruptly acuminate, acute or more or less rounded at the base, immersed glands linear or dot-like. Peduncles 2–4 together at the ends of the branches, rarely solitary, 1–2¾ in. long, rather slender, glabrous. Spathe 1¼–1¾ in. long, convolute to half way up when in flower, and afterwards nearly to the top, green; limb elliptic-oblong, obtuse, apiculate, hooded or deeply concave. Spadix at first about ⅓ in. longer than the spathe, after the fall of the anthers ½–¾ in. longer; female part about 5–6 lin. long, cylindric, laxly floriferous; male part 1–1¼ in. long, 2–2½ lin. thick, cylindric-fusiform, or somewhat clavate, stouter than the female part, densely covered with anthers, of which the lower are abortive. Ovaries scattered, depressed-globose, seated in slight depressions of the axis; stigma large, discoid, sessile.—Kunth, Enum. iii. 46; Schott, Synop. Aroid. 115, Prod. Aroid. 218, and Gen. Aroid. t. 50; Hook. Niger Fl. 527; Kotschy & Peyr. Pl. Tinn. 42; Engl. in DC. Monogr. Phan. ii. 102, in Pfl. Ost-Afr. C. 131, and in Jahrb. xv. 447; Engl. & Prantl, Pflanzenfam. ii. iii. 116, and Nachtr. zu ii.–iv. 58; Durand & Schinz, Consp. Fl. Afr. v. 471, and Études Fl. Congo, i. 275; Rendle in Cat. Afr. Pl. Welw. ii. 90; De Wild. & Durand, Contrib. Fl. Congo, i. fasc. 2, 64. *Caladium scandens*, Willd. Sp. Pl. iv. 489. *Denhamia scandens*, Schott, Melet. 19.

Upper Guinea. Sierra Leone: Kambia, under trees, *Scott-Elliot*, 4229! near Berria, *Scott-Elliot*, 4459A! between Bumban and Port Lokko, *Scott-Elliot*, 5743! and without precise locality, *Smeathman! Afzelius! Isert* (ex *Schott*), Lagos: interior, *Rowland!* near Lagos, *Moloney!* Niger Territory: Nupe, climbing about the roots of trees and on river banks, *Barter*, 1471! River Quorra (Niger), opposite Stirling, *Vogel*, 204! Niger Delta: banks of the River Nun, *Mann*, 516! Cameroons: between Cameroon and Gaboon, *Bucholz* (ex *Engler*); Victoria Mountains, *Mann* (ex *Engler*); and without precise locality, *Preuss*, 1333!

Nile Land. British East Africa: Bongo; by the River Mokloio, near Dukuttu, *Schweinfurth*, 2806! not far from the River Dembo, *Tinne*, 11 (ex *Kotschy & Peyritsch*); Jur; Genana, near Jur Ghattas, *Schweinfurth*, 1354! and 3756 (ex *Engler*). Uganda, climbing on trees, *Scott-Elliot*, 7373!

Lower Guinea. Princes Island in the Lower Congo, *Laurent* (ex *Durand & Schinz*). Congo, *Smith*, 41! Stanley Pool, *Demeuse* (ex *Engler*). Angola: Golungo Alto; in the woods of Mata de Quisuculo, near Bango, 1000–2400 ft., *Welwitsch*,

233 ! 1016 (ex *Rendle*) ; and in dense woods by the spring of Capopo, *Welwitsch*, 235 (ex *Rendle*) ; Pungo Andongo ; in shady woods of Mata de Quilanga, near streams 2400–3800 ft., *Welwitsch*, 234! and in shady woods on the islands of Calemba in the River Cuanza, *Welwitsch*, 234/2 (ex *Rendle*).

South Central. Congo Free State: Niamniam ; at the village of Wando, *Schweinfurth*, 3217 (ex *Engler*), and at Assika River, *Schweinfurth*, 3248 (ex *Engler*), Luvituku, *Luja*.

Mozamb. Dist. German East Africa: banks of the River Kingani, *Kirk !*

2. **C. lancifolia,** *N. E. Br.* Stem very slender, 1–1¼ lin. thick, with a few minute tubercles. Leaves much spreading, ¼–⅓ in. distant, small, glabrous; petiole 6–9 lin. long, sheathing nearly or quite to the top ; apex of sheath rounded; blade 2½–4 in. long, ⅔–1 in. broad, unequal-sided, lanceolate, slightly falcate, tapering to a long acuminate apex, mucronulate, cuneate-acute at the base ; primary lateral nerves 9–11 on each side of the midrib, slightly prominent on both sides ; immersed glands numerous, linear, short, rather indistinct. Peduncles in pairs, terminal, ½–1 in. long, rather slender. Spathe ¾–1 in. long, 3–4 lin. broad, oblong, obtuse, convolute to about half-way up, persistent for some time after the fall of the anthers. Spadix longer than the spathe, subsessile or shortly stipitate ; female part 2–3 lin. long, cylindric ; male part 9–13 lin. long, somewhat clavate, obtusely pointed, about 1½ lin. thick; lower anthers abortive. Ovary very small, ellipsoid, 1-celled ; stigma discoid.

Upper Guinea. Near Lagos, *Moloney !*

3. **C. insulana,** *N. E. Br.* Stem climbing, 1½–2 lin. thick, minutely granulate-tuberculate on the older parts. Leaves spreading, 1–3 in. distant, glabrous ; petiole 1¾–3 in. long, sheathing to 3–5 lin. from the top, rather slender ; apex of sheath prominent, rounded ; blade 2½–5¾ in. long, 1–1¾ in. broad, lanceolate, unequal-sided, acuminate into a long very acute point, cuneately rounded in at the base ; primary lateral nerves 7–9 on each side of the midrib, the two lowest in a long sweeping curve running out to the margin, the 5th forming an intramarginal nerve about ⅔ of the distance between midrib and margin, the others uniting with these, all slightly prominent on both sides ; glands dot-like, or occasionally linear, sometimes wanting in the central part of the leaf, or entirely absent. Peduncle 1¾–2 in. long, solitary or in pairs, terminal. Spathe about 1¼ in. long, oblong apiculate, convolute to half way up, soon falling off, green (*Mann*). Spadix subsessile or very shortly stipitate, shorter than the spathe ; female part about 3 lin. long ; male 8–9 lin. long. Ovaries 5–6-angled from mutual pressure, flat-topped, 1-celled ; stigma small discoid.

Upper Guinea. Fernando Po, 1000 ft., *Mann*, 325 ! 4000 ft., *Mann*, 651 !

Allied to *C. scandens*, Beauv., but readily distinguished by its narrower, more acuminate leaves, in which the immersed glands are usually dot-like, rarely linear, and usually occur towards the margins.

4. **C. falcifolia,** *Engl. Jahrb.* xxvi. 418. Stem climbing ; internodes ¾–1¼ in. long. Leaves subcoriaceous ; petioles long-sheathed,

4 in. long; blade 8-10 in. long, 2 in. broad, obliquely lanceolate, slightly falcate, curved at the apex, very unequal-sided, one side being twice as broad as the other; primary lateral nerves making a very acute angle with the midrib, ascending, slightly prominent in the dried state. Peduncle about 4 in. long. Spathe $1\frac{3}{4}$ in long, $\frac{3}{4}$ in. broad, oblong, long-acuminate, orange. Spadix a little shorter than the spathe; female part $2\frac{1}{2}$ lin. long. Male part nearly $1\frac{1}{4}$ in. long. Ovary sub-hemispherical; stigma sessile, broad, deeply excavated.

Mozamb. Dist. German East Africa: Uluguru, in the Forest of Ngh'wenu, 5200 ft., on trees, *Stuhlmann*, 8817.

I have not seen this plant.

5. **C. lanceolata,** *Engl. Jahrb.* xxvi. 419. Stem slender, creeping or climbing; internodes 7-9 lin. long. Leaves thin; petiole about $\frac{3}{4}$ in. long, sheathing for half its length, deeply channelled; blade $2\frac{3}{4}$–$3\frac{1}{4}$ in. long, 7-12 lin. broad, lanceolate or narrowly lanceolate; immersed glands numerous, linear; primary lateral nerves 4–5 on each side, spreading, uniting not far from the margin. Peduncle about 5 lin. long. Spathe 7 lin. long, 3–$3\frac{1}{2}$ lin. broad, shell-shaped. Ovary subglobose; stigma discoid. Berries about $2\frac{1}{2}$ lin. diam., subglobose.

Upper Guinea. Cameroons: on trees in the Forest of Lokundje, near Lolodorf, 1600 ft., *Staudt*, 32; near Campo, *Dinklage*.

I have not seen this species.

6. **C. parviflora,** *N. E. Br.* Stem climbing to a height of 12-15 ft., 1–$1\frac{1}{2}$ lin. thick, not tubercled, pallid. Leaves spreading, 1–$1\frac{3}{4}$ in. distant, glabrous; petiole $\frac{1}{2}$–$1\frac{1}{4}$ in. long, sheathing to $1\frac{1}{2}$–3 lin. from the top, slender; blade $2\frac{1}{2}$–$5\frac{1}{4}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, slightly unequal-sided, slightly falcate, lanceolate, tapering to a fine acuminate point, cordate at the base; veins slightly prominent on both sides; immersed glands linear, superficial glands numerous, sessile, crater-shaped, whitish in the dried state. Raceme very short, sessile, terminal, 2–3-flowered. Bracts 2–6 lin. long, 1–$1\frac{3}{4}$ lin. broad, oblong-lanceolate, acute, submembranous, green. Peduncles 5–8 lin. long, rather slender, more or less recurved. Spathe 6–8 lin. long, 3–4 lin. diam., oblong-obovoid, obtuse, apiculate, convolute to half way up, green, persistent for some time after flowering. Spadix shorter than the spathe; female part 2–$2\frac{1}{2}$ lin. long, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. thick; male part about 3 lin. long. Ovaries about 12, angular from pressure, 2-celled; stigma small.

Upper Guinea. Fernando Po, *Mann*, 105!

A very distinct species, easily distinguished by the cordate-based leaves and small spathes. It was sent alive by Gustav Mann to Kew, where it flowered in December 1860.

A plant collected in the Cameroons by Preuss (498) may, perhaps, be a form of this species; it was distributed by Engler as *C. scandens*, from which it is quite distinct.

7. **C. tenuifolia,** *Engl. in Engl. Jahrb.* xv. 447. Leaves membranous; petiole 2–$4\frac{3}{4}$ in. long, sheathing for $\frac{3}{4}$ of its length, apex of

the sheath biauriculate; blade 4–12 in. long, 2–4¾ in. broad, oblong-elliptic, tapering to a long narrowly acuminate point, acute at the base, slightly unequal-sided; primary lateral nerves about 5 on each side of the midrib, slightly prominent on both sides. Peduncles 3–4 together at the ends of the branches, ¾–1¼ in. long. Spathe about 2 in. long, convolute, much decurrent at the base. Spadix shorter than the spathe; female part 2½–4½ lin. long; male part about 14 lin. long. Ovary ovoid, 1-celled; stigma orbicular, concave. Berries oblong, purple.

Upper Guinea. Cameroons: on rocks on the north side of Barombi Gorge, *Preuss*, 542.

I have not seen this species.

8. **C. Dinklagei,** *Engl. Jahrb.* xxvi. 418. Stem 2½–3 lin. thick, creeping; internodes 5–7 lin. long. Leaves large; petiole 2¼–2¾ in. long, sheathing for ⅔ of its length; blade 8–12 in. long, 2¾–4¾ in. broad, obliquely lanceolate, shortly excavated at the apex, acute at the base; primary lateral veins numerous, ascending, curved, and together with the reticulated veinlets prominent beneath. Peduncle 2–2½ in. long. Spathe 2⅓ in. long, 7 lin. broad, oblong-lanceolate. Berries very large, 1 in. in diam., subglobose, 3-seeded, with obliquely ovoid seeds, or rarely 1-seeded, with a hemispherical seed. Seed about 5 lin. long and 4 lin. thick.

Upper Guinea. Cameroons: in damp, deep-shaded woods at Batanga, *Dinklage*, 899.

I have not seen this species.

9. **C. obliquifolia,** *Engl. Jahrb.* xxvi. 418. Stem with internodes about 2 in. long. Leaves large; petiole about 6 in. long, sheathing for about ⅔ of its length; blade 10 in. long, 4¾ in. broad, obliquely oblong, very unequal-sided, broad below, acute at the base, narrowed upwards on one side in a straight line; primary lateral nerves curved, ascending, very prominent beneath; veins slender, reticulate. Peduncles 2–3 together, 2 in. long, forming a sympodium, deflexed in fruit. Berries large, about ¾ in. in diam., subglobose or shortly ovoid, 1–2-seeded.

Upper Guinea. Cameroons: at Ebea (Edea) Falls, *Dinklage*, 880.

I have not seen this plant.

10. **C. barombensis,** *N. E. Br.* Stem climbing, ¼ in. thick, not tubercled. Leaves spreading, 1½–2½ in. distant, glabrous; petioles 4–5¼ in. long, sheathing to ½–1¼ in. from the top; blade 4¼–8 in. long, 2–3½ in. broad, unequal-sided, obliquely oblong, shortly cuspidate-acuminate, cuneately rounded into an obtuse base; primary lateral veins 9–11 on each side of the midrib; no glands. Peduncles 3–4 (or more?) in a short terminal bracteate raceme, 1–1¼ in. long, moderately stout. Bracts 1¾–2 in. long, 7–9 lin. broad, oblong, acute, with 2 wing-like keels down the back. Spathe about 2 in. long, 1 in. broad, elliptic or elliptic-oblong, obtuse, apiculate, expanded, deeply concave,

very shortly convolute at the base, soon falling off. Spadix shorter than the spathe, sessile, clavate; female part 3–4 lin. long, 2–2½ lin. thick; male part about an inch long, about 4 lin. thick near the obtusely rounded apex.—*C. angolensis*, Welw., var. *angustifolia*, Engl. in Engl. Jahrb. xv. 447; Durand & Schinz, Consp. Fl. Afr. v. 471.

Upper Guinea. Cameroons: Barombi, *Preuss*, 388!

This is perfectly distinct from *C. angolensis*, Welw., in its smaller and differently shaped leaves, smaller inflorescence, and fewer flowers.

11. **C. angolensis,** *Welw. ex Schott in Journ. Bot.* 1865, 35. Stem climbing to a height of 80–100 ft., ⅓–½ in. thick, not tubercled. Leaves large, 2–6 in. distant, glabrous; petioles 4–10 in. long, sheathing up to 1–2 in. from the top; apex of sheath prominent, rounded; blade 7–15 in. long, 4–7½ in. broad, unequal-sided, elliptic-oblong, cuspidate-acute, or shortly acuminate, broadly rounded or subtruncate at the base; primary lateral veins 10–15 on each side of the midrib, prominent beneath; no glands. Peduncles numerous in a stout terminal bracteate raceme, 1¾–3½ in. long, moderately stout. Bracts 3–4 in. long, about 1–1¼ in. broad, oblong, obtuse or acute, with 2 wing-like keels down the back. Spathe about 2½ in. long and 2 in. broad, elliptic, obtuse, apiculate, expanded, deeply concave, very shortly convolute at the base, green (*Mann*), soon falling off; margins revolute. Spadix shorter than the spathe, sessile, clavate; female part about 5 lin. long, ¼ in. thick; male part 1¼–1½ in. long, 4–6 lin. thick near the obtusely rounded apex. Ovaries about 25–28, depressed-globose, 2-celled; stigma large, discoid. Anthers densely crowded, in groups of 4. Berries red.—Engl. in DC. Monogr. Phan. ii. 102; Durand & Schinz, Consp. Fl. Afr. v. 471; De Wild. & Durand, Contrib. Fl. Congo, i. 64; Henriques in Bolet. Soc. Brot. v. 207, and xvi. 39; Rendle in Cat. Afr. Pl. Welw. ii. 90.

Upper Guinea. Sierra Leone: in the shade of woods at Likuru, 3000 ft., *Scott-Elliot*, 4950! Gold Coast: Aburi, *Johnson!* Fernando Po, *Mann*, 102!

Lower Guinea. Island of St. Thomas: banks of the River Contador, 5500 ft., *Moller* (ex *Henriques*). Lower French Congo: Mayumba (Mayombe) District, *Dupuis* (ex *Engler*). Lower Congo, *Laurent* (ex *De Wildeman & Durand*). Angola: between the River Cuango and River Quihumbo, *Marques* (ex *Henriques*); Golungo Alto; frequent in moist shady woods in Sobato de Bumba and Alta Queta, 1000–2400 ft., *Welwitsch*, 239! in woods near Sange, *Welwitsch*, 239/2 (ex *Rendle*), and in woods called Quisuculo, near Bango Aquitamba, *Welwitsch*, 239/3 (ex *Rendle*); Pungo Andongo; in the woods of Quilamga, 2400–3800 ft., *Welwitsch*, 240!

South Central. Congo Free State: Sankuru River, *Laurent* (ex *De Wildeman & Durand*).

12. **C. Mannii,** *Engl. in Gartenfl.* 1887, 84. Stem 1–1½ ft. high, ½ in. thick. Leaves ascending, glabrous; petiole 1½–3½ in. long, broadly sheathing up to 2–7 lin. from the top; apex of sheath not auricled; blade 4½–9½ in. long, 2¾–5 in. broad, unequal-sided, elliptic or elliptic-oblong, subacute, obtuse or somewhat rounded at the base, bright green with dark green veins above, not shining, light green beneath, with scattered dark-coloured glands that become very indistinct in the dried

state; midrib and veins impressed above, prominent beneath, conspicuously reticulate. Peduncle solitary, terminal, 1–1¼ in. long, ⅛ in. thick, glabrous. Spathe 1⅓–1¾ in. long, ¾–1 in. broad, convolute at the base only, upper part expanded, elliptic, obtuse, apiculate, white within, greenish outside in the basal part, glabrous. Spadix shorter than the spathe, 2½ lin. thick, cylindric, obtuse, stipitate; stipes 2–3 lin. long; female part 4–5 lin. long; male part about ½ in. long. Ovaries 12–15, depressed, angular from mutual pressure, dull scarlet, 2-celled; stigma sessile, whitish. Anthers crowded, milk-white. Berries 4–5-angled, dull vermilion-red, not shining.—Engl. Jahrb. xv. 447; Engl. & Prantl, Pflanzenfam. ii. iii. 116, and Nachtr. zu ii.–iv. 58; Durand & Schinz, Consp. Fl. Afr. v. 471. *Aglaonema Mannii*, Hook. f. in Bot. Mag. t. 5760; Engl. in DC. Monogr. Phan. ii. 442.

Upper Guinea. Cameroons: Victoria Mountains, cultivated specimens, *Mann!* Mungo, in damp forests, *Buchholz*, 94,134 (ex *Engler*).

When held to the light the spaces between the primary lateral veins are seen to be traversed by one or more very long translucent laticiferous vessels, often visible to the naked eye on the underside of the dried leaves as long, dark, very slender lines, and very evident in the living state.

13. **C. striolata,** *Engl. Jahrb.* xxvi. 417. Stem about ½–1 ft. high, 1½–2 lin. thick in the dried state, erect, not tubercled, supported by long stilt-like roots about as stout as the stem; internodes 4–7 lin. long. Leaves collected on the upper part of the stem, membranous; petiole 1¼–2½ in. long, sheathing up to 1–7 lin. from the top; apex of the sheath biauriculate; blade 4–6½ in. long, 1¼–2¾ in. broad, unequal-sided, somewhat oblanceolate or oblanceolate-oblong, acuminate, narrowed below the middle to a cuneate acute base, shining dark green above, paler beneath, abundantly marked with linear glands; primary lateral veins 12–15 on each side of the midrib, and, together with the reticulated secondary veins, slightly prominent on both sides. Peduncle solitary, terminal, ¾–1 in. long. Spathe 1–1¼ in. long, 7–9 lin. broad, elliptic, obtuse, apiculate, convolute at the base only, boat-shaped above, green, glabrous. Spadix shorter than the spathe, stipitate; stipes about 1½ lin. long; female part 1–1½ lin. long; male part 6–8 lin. long, cylindric, stouter than the female. Ovaries 8–10, depressed, 2-celled, buff-coloured; stigma very large, sessile, discoid. Anthers pale pink.—Notizbl. K. Bot. Gart. Berl. 1899, 281; Engl. & Prantl, Pflanzenfam. Nachtr. zu ii.–iv. 58.

Upper Guinea. Cameroons: Ambas Bay, *Mann*, 781! near the shore, *Kalbreyer*, 86! *cultivated specimen!* in light forest between Victoria and Bimbia, *Preuss*, 1161!

Introduced to Kew by Mr. Gustav Mann, where it flowered in 1862.

14. **C. gracilis,** *N. E. Br.* Stems 2–3 ft. high, 1½–2 lin. thick, erect, branching, rough with minute tubercles. Leaves rather small, ½–2¾ in. distant; petioles 1–2 in. long, sheathing up to about ¼ in.

from the top; apex of sheath auriculate, rounded; blade $2\frac{1}{4}$–3 in. long, $\frac{3}{4}$–1 in. broad, lanceolate, acute, or somewhat acuminate, mucronulate, acute or subacute at the base; glands few and very obscure, linear. Peduncle terminal, solitary, $1\frac{3}{4}$ in. long. Spathe and spadix not seen. Berries 3–4 lin. long, ellipsoid, red.

Upper Guinea. Sierra Leone: on the wet banks of the river at Dantilia, *Scott-Elliot*, 5293!

15. **CERCESTIS,** Schott; Benth. et Hook. f. Gen. Pl. iii. 980.

Spathe convolute in the lower part, concave or boat-shaped above, deciduous. Spadix free, monœcious, without an appendix or neuter organs; male and female parts contiguous. Perianth none. Ovary 1-celled; stigma sessile, large, discoid. Ovule solitary, subbasal, or a little above the base on that side of the ovary which is directed towards the apex of the spadix, anatropous. Male flowers crowded; anthers 2–4, free, sessile, broadly cuneate-oblong, truncate, 2-celled; connective broad; cells opening by terminal pores. Berries ellipsoid or obovoid, 1-seeded. Seed erect, ellipsoid; testa rather thin, subcoriaceous; albumen copious; embryo very small, seated at the base of the albumen.—Stems climbing or creeping, rooting. Leaves alternate, petiolate, cordate-oblong, sagittate, hastate or 3-lobed, penniveined; primary veins distant, secondary reticulated; petiole sheathing at the base or to the middle. Peduncle solitary, terminal or leaf-opposed.—*Alocasiophyllum*, Engl. Jahrb. xv. 449.

An endemic genus of 5 species. I cannot in any way distinguish *Alocasiophyllum*, Engl., from *Cercestis*, Schott.

Leaves 3-lobed; basal lobes widely spreading, acute or obtusely acuminate	1. *C. Afzelii.*
Leaves hastate or hastate-sagittate; basal lobes very obtuse.	
Part of leaf above the basal lobes deltoid or ovate-deltoid	2. *C. congensis.*
Part of leaf above the basal lobes oblong-lanceolate.	
Basal lobes narrowly oblong, somewhat falcately curved outwards	3. *C. stigmaticus.*
Basal lobes deltoid	4. *C. Dinklagei.*
Leaves lanceolate-oblong, shortly cordate at the base	5. *C. kamerunianus.*

1. **C. Afzelii,** *Schott in Oesterr. Bot. Wochenbl.* 1857, 414. Stem climbing or creeping on the ground, rooting, 2–$2\frac{1}{2}$ lin. thick, usually slightly rough to the touch. Leaves petiolate, glabrous; petiole 3–12 in. long, with a long or short sheath; blade hastately 3-lobed; middle lobe $2\frac{1}{2}$–$6\frac{1}{2}$ in. long, $1\frac{1}{4}$–4 in. broad; oblong or lanceolate, acute or acuminate; basal lobes $1\frac{1}{2}$–$4\frac{1}{2}$ in. long, $\frac{3}{4}$–3 in. broad, lanceolate, obtusely acuminate, widely divergent, 3-nerved, sometimes with a lobule on their lower side; basal sinus broad and open. Peduncle solitary, terminal, usually about $1\frac{1}{2}$ in. long, moderately stout, glabrous. Spathe $1\frac{3}{4}$–2 in. long, convolute in the basal third; limb erect, elliptic-

oblong, obtuse, deeply concave. Spadix longer than the spathe; female part about ½ in. long, cylindric; male part about 1½ in. long, 3–3½ lin. thick, cylindric, obtuse. Ovaries numerous, densely crowded, oblong, angular; stigma large, discoid, sessile. Berries 4–6 lin. long, obovoid, "reddish-scarlet" (*Johnston*).—Gen. Aroid. t. 52, and Prod. Aroid. 219; Engl. in DC. Monogr. Phan. ii. 301; Engl. & Prantl, Pflanzenfam. ii. iii. 128; Durand & Schinz, Consp. Fl. Afr. v. 475.

Upper Guinea. Sierra Leone: Bagru River, *Mann*, 906! near Leicester, *Barter!* banks of a stream near Wilberforce, 400 ft., *Johnston*, 105! at Luseniya, *Scott-Elliot*, 4078! North-east from Sierra Leone, *Garrett*, 2! Sherboro Island, *Garrett in herb. Scott-Elliot*, 5792! Bendembu, *Scott-Elliot*, 5683! and without precise locality, *Afzelius!* French Guinea: Sangara District; in wet places in woods by the River Niger, at Farana, *Scott-Elliot*, 5319! Ashanti: Assin-Yan-Coomassie, *Cummins*, 178! Gold Coast: Kibbi Hills, at Akim, *Johnson*, 258!

2. **C. congensis,** *Engl. in Engl. Jahrb.* xv. 448. Stem climbing or creeping, rooting, 1½–2 lin. thick, minutely tubercled. Leaves petiolate, glabrous; petiole 4–6 in. (8–12 in., *Engler*) long, very shortly sheathing at the base, slender; blade 5–7 in. long, 3¼–6¼ in. broad across the basal lobes, hastate or sagittate; front lobe deltoid-ovate, acute or acuminate, 2¼–3½ in. broad; basal lobes 2–3 in. long, 1–1½ in. broad, more or less spreading, somewhat obliquely ovate, very obtuse, the inner margin more or less abruptly dilated a little above the base; basal nerves denuded for 3–5 lin. in the broadly rounded open sinus. Peduncle solitary, terminal, 1–2½ in. long, 1 lin. thick, glabrous. Spathe (unexpanded) about 1½ in. long, glabrous. Spadix similar to that of *C. Afzelii*, but more slender.—*C. congoensis*, Durand & Schinz, Consp. Fl. Afr. v. 475, and Études Fl. Congo, i. 276; De Wild. & Durand, Contrib. Fl. Congo, i. fasc. 2, 65.

Lower Guinea. Lower Congo, *Smith!* Stanley Pool, *Demeuse*, 65 (ex *Engler*). Princes Island in the Lower Congo, *Laurent* (ex *Durand & Schinz*).

3. **C. stigmaticus,** *N. E. Br.* Stem slender, glabrous, rooting as it climbs. Leaves glabrous; petiole 1½–6 in. long, slender, terete, channelled down the face, with a very broad sheath 2–3 lin. long; blade 4½–9 in. long, 1¾–4 in. broad, elliptic-oblong, acuminate, hastate-sagittate at the base, contracted just above the diverging falcate-oblong obtuse basal lobes, which are 1¼–2¼ in. long and ½–1 in. broad. Peduncle 1½–2¼ in. long, glabrous. Spathe 1¾–2¼ in. long, oblong, convolute at the base; limb boat-shaped, obtuse, glabrous, green. Spadix 1¾–2 in. long, cylindric; female part about ¼ in. long. Ovary subcylindric or shortly and broadly conical, 1-celled; stigma peltate, very large, umbrella-shaped, completely hiding the ovary from above.

Upper Guinea. Fernando Po, 1300 ft., *Mann*, 324!

4. **C. Dinklagei,** *Engl. in Engl. Jahrb.* xxvi. 422. Stem slender, climbing by its roots, about 1 lin. thick. Leaves petiolate, glabrous; petiole 4–8 in. long; blade 6–10 in. long, elongated-sagit-

tate-lanceolate or hastate; front lobe oblong-lanceolate, acuminate, acute; basal lobes $\frac{3}{4}$–2 in. long, usually deltoid, obtuse, more or less divergent, separated by a large sinus. Peduncle $2\frac{1}{4}$–$3\frac{1}{6}$ in. long. Spathe about $2\frac{1}{3}$ in. long, convolute, slightly constricted below the middle, apiculate, green. Spadix about 2 in. long; female part $\frac{1}{3}$–$\frac{1}{4}$ the length of the male part. Ovary shortly ovoid; stigma broadly orbicular. Berries 4–$4\frac{1}{2}$ lin. thick, red. Seed about $\frac{1}{4}$ in. long, ovoid.

Upper Guinea. Cameroons: Batanga, on forest trees and shrubs, *Dinklage*, 790, 1302.

Lower Guinea. Gaboon: Munda; Sibange, at Abandu River, *Büttner*, 518.

I have not seen this species.

5. **C. kamerunianus,** *N. E. Br.* Stem about $\frac{1}{8}$ in. thick, glabrous, rooting as it climbs. Leaves spreading or ascending, glabrous; petiole 2–4 in. long, slender, terete, flattened down the face, with a very broad sheath about $\frac{1}{4}$ in. long; blade 5–8 in. long, 2–3 in. broad, lanceolate-oblong, acute or acuminate, narrowed from below the middle to the shortly cordate base. Peduncle $\frac{1}{4}$–$1\frac{1}{2}$ in. long, terete, smooth. Spathe $1\frac{3}{4}$–2 in. long, convolute at the base, expanded above, concave, obtuse. Spadix about as long as the spathe or a little longer, cylindric; female part about $\frac{1}{2}$ in. long. Ovary globose, 1- rarely 2-celled; stigma sessile. —*Alocasiophyllum kamerunianum*, Engl. in Engl. Jahrb. xv. 449, t. 19; Durand & Schinz, Consp. Fl. Afr. v. 475; Engl. & Prantl, Pflanzenfam. Nachtr. zu ii.–iv. 60.

Upper Guinea. Cameroons: Barombi District, at Wege, between Kumba Ninga and Mokonje, *Preuss*, 147 (ex *Engler*).

Lower Guinea. Gaboon River, *Mann*, 1041!

16. **ANUBIAS,** Schott; Benth. et Hook. f. Gen. Pl. iii. 975.

Spathe expanded nearly to the base or convolute to the middle, persistent. Spadix longer or shorter than the spathe, free, monœcious, without an appendix; male and female parts contiguous. Perianth none. Female flowers: Ovary 2–3-celled; style very short or 0; stigma discoid or cushion-like; ovules numerous in each cell, anatropous, axile. Male flowers: Anthers 5–6, connate into a sessile hexagonal truncate body, opening by subterminal pores. Berries enclosed within the spathe, subglobose, 2–3-celled, many-seeded. Seeds small, irregularly ovoid; testa rather thick; albumen fleshy; embryo axile.—Herbs with creeping stems or rhizomes. Leaves alternate, petiolate, pinnately veined; veins numerous, parallel; petiole sheathing. Peduncles axillary, solitary, elongated.

An endemic genus of 7 or 8 species.

Leaves lanceolate, broadest at the middle, at least 3 times as long as broad; midrib and veins quite glabrous beneath.

Blade of leaf 9–12 in. long; spathe $2\frac{1}{2}$ in. long, convolute . . . . . 1. *A. Afzelii.*

Blade of leaf 4–6 in. long; spathe 1–2 in. long, expanded . . . . . 2. *A. lanceolata.*
Leaves variable, ovate-lanceolate to subhastate, usually broadest below the middle, 2–2½ times as long as broad; basal lobes, when present, short, broadly rounded.
Spathe convolute when in flower.
Underside of the midrib quite glabrous . . 3. *A. heterophylla.*
Underside of the midrib and usually the apex of the petiole minutely puberulous.
Basal lobes of leaf contiguous or overlapping, not ¼ in. long . . . . . 4. *A. auriculata.*
Basal lobes of leaf, when present, separated by an open sinus, ¼–¾ in. long . . . 5. *A. congensis.*
Spathe expanded when in flower . . . . 6. *A. Barteri.*
Leaves hastate with very spreading, linear-lanceolate, entire or lobulate basal lobes . . . . 7. *A. hastifolia.*

1. **A. Afzelii,** *Schott in Oestern. Bot. Wochenbl.* 1857, 399. Aquatic. Leaves erect, glabrous; petiole long, geniculate at the apex; blade about 1 ft. long, 3–4 in. broad, lanceolate, acute, narrowed to the rounded or subtruncate base; primary veins very numerous, parallel, slightly curved, ascending. Peduncle long, smooth. Spathe 2½ in. long, convolute, tubular, only open at the apex, obtuse, apiculate. Spadix longer than the spathe, cylindric; female part 10–11 lin. long, male 1¾ in. long, the lowest male flowers more or less abortive. Ovary subglobose; style very short; stigma discoid.—Schott, Prod. Aroid. 159, and Gen. Aroid. t. 42; Engl. in DC. Monogr. Phan. ii. 434, Jahrb. xv. 463 (excluding the Cameroon and Angolan specimens), and Araceæ, t. 121 as to analyses (copied from Schott) only; Durand & Schinz, Consp. Fl. Afr. v. 476 partly.

Upper Guinea. Sierra Leone: Bafodeya, *Scott-Elliot,* 5560! near Kahreni, *Scott-Elliot,* 5623! rivulets near Vatemba Road, *Barter!* in swamps at Intro, *Johnson,* 732! and without precise locality, *Afzelius! Don!*

On the label with Don's specimen in the British Museum Herbarium is the following note: "Aquatic, a full foot under water."

The *A. Afzelii* of Engl. in Mitth. Deutsch. Schutzgeb. ii. (1889) 149, collected by *Braun* at Batanga in the Cameroons, and of De Wildeman & Durand, Contrib. Fl. Congo, i. fasc. 2, 65, collected by *Laurent* at Mpioka, in the Congo Free State, probably belongs to some other species.

2. **A. lanceolata,** *N. E. Br.* Stem stout, creeping and rooting, 5–6 lin. thick, densely leafy. Leaves erect, glabrous; petiole 2½–5½ in. long, its sheath 2–2½ in. long, very broadly dilated at the base; blade 4–6 in. long, 1–2 in. broad, lanceolate, equally tapering at both ends, subobtuse at the apex, narrowly rounded at the base; veins numerous, parallel, ascending, slightly curved. Peduncle about 5 in. long, slender, glabrous. Spathe 1–2 in. long, oblong, obtuse, apiculate, convolute at the base, expanded above, white. Spadix about as long as the spathe

or a little longer, cylindric; female part about $\frac{1}{4}$ in. long. Ovaries crowded; stigma sessile.

Upper Guinea. Niger Territory: by a river on the north-west of Ikure (Ekure) between Old Calabar and Cross River, *Holland*, 167! Cameroons: Rio del Rey, *Johnston!*

3. **A. heterophylla,** *Engl. in DC. Monogr. Phan.* ii. 435. Stem creeping and rooting, $\frac{1}{4}$–$\frac{1}{3}$ in. thick. Leaves erect, quite glabrous; petiole 2–15 in. long, its sheath 1–5 in. long; blade 6–12 in. long, $2\frac{1}{4}$–5 in. broad, oblong-ovate or more or less lanceolate, acute or acuminate at the apex, acute, rounded, subtruncate, or shortly cordate-hastate at the base; basal lobes short, obtusely rounded; veins numerous, parallel, curved, ascending; midrib and primary veins quite glabrous on both sides. Peduncle longer than the petioles, slender, glabrous. Spathe convolute at the base, slightly open at the apex, fleshy, $1\frac{1}{4}$–2 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, oblong, rather abruptly subulate-pointed, glabrous, green. Spadix $1\frac{1}{6}$–2 in. long, slender, cylindric; female part $\frac{1}{4}$–$\frac{1}{2}$ in. long. Ovaries crowded, angular from mutual pressure, green; style short; stigma discoid. Anthers whitish.—Engl. Jahrb. xv. 463; Durand & Schinz, Consp. Fl. Afr. v. 476; Rendle in Cat. Afr. Pl. Welw. ii. 88. *A. Afzelii*, Engl. Araceæ, t. 121, as to fig. of plant, not of analyses; Durand & Schinz, Consp. Fl. Afr. v. 476 partly; Rendle in Cat. Afr. Pl. Welw. ii. 89.

Lower Guinea. Angola: Golungo Alto; in woods at the fountain of Quibolo, 1000–2400 ft., *Welwitsch*, 237! 237/2! 237/3! 238! Cazengo; in woods by streams in Muxaulo Mountains, 2000 ft., *Welwitsch*, 236!

4. **A. auriculata,** *Engl. Jahrb.* xxvi. 423. Rhizome creeping and rooting, 2–$2\frac{1}{2}$ lin. thick. Leaves close together at the tips of the rhizome, but not crowded, erect; petiole 7–9 in. long, terete, glabrous below, pubescent on the apical part, abruptly dilated into a short broad clasping sheath at the base, which is continued up the petiole for about $\frac{1}{3}$ of its length in the form of a groove, which is very slightly or not at all winged at the sides; blade 6–9 in. long, 3–$3\frac{1}{4}$ in. broad, broadly ovate-lanceolate, acute, very shortly-cordate-auriculate at the base; auricles $1\frac{1}{2}$–2 lin. long, rounded, overlapping; midrib and primary veins minutely puberulous beneath. Peduncle 5–6 in. long, minutely puberulous on the apical part. Spathe $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, oblong, subtruncate at the apex. Spadix cylindric, shorter than the spathe; female part about $3\frac{1}{2}$ lin. long.

Upper Guinea. Cameroons: Bipinde, in the forest, *Zenker*, 1174! Batanga, *Dinklage*, 986 (ex *Engler*).

5. **A. congensis,** *N. E. Br.* Rhizome creeping and rooting, rather stout, 4–5 lin. thick. Leaves erect; petiole $4\frac{1}{2}$–10 in. long, with a distinct, narrow, persistent sheath $2\frac{1}{4}$–$4\frac{1}{2}$ in. long, dilated and clasping at the base, minutely puberulous at the apex, glabrous below; blade 6–$8\frac{1}{2}$ in. long, $2\frac{1}{4}$–4 in. broad, oblong or oblong-lanceolate, acute, cuneately or broadly rounded or more or less cordate at the base, with broadly rounded basal lobes $\frac{1}{4}$–$\frac{1}{3}$ in. long, not overlapping; midrib and

primary veins minutely puberulous beneath. Peduncles 4–10 in. long. Spathe 1–1¾ in. long, ovoid or ellipsoid not expanded, obtuse, very shortly apiculate, glabrous, pale dull green. Spadix a little shorter than the spathe, 10–13 lin. long, cylindric; female part about 3 lin. long. Ovaries not very crowded, globose; style short, stout; stigma discoid.—*A. heterophylla*, N. E. Br. in Gard. Chron. 1889, vi. 67, not of Engl.

Lower Guinea. Lower Congo: Boma, *cultivated specimens!* Introduced by Mr. Bull, of Chelsea.

This is similar to some forms of *A. Barteri*, Schott, but differs in its convolute, ovoid or ellipsoid spathe, open in the upper part only, not expanded nearly to the base, as in *A. Barteri*.

6. **A. Barteri,** *Schott, Prod. Aroid.* 159. Stem creeping and rooting, 2–3 lin. thick, glabrous. Leaves erect, variable, glabrous above; petiole 2–11 in. long, slender, its sheath 1–1½ in. long, dilated at the base; blade 2¾–8 in. long, 1¼–4 in. broad, ovate or ovate-lanceolate, acuminate at the apex, rounded, subtruncate or more or less cordate-hastate at the base; basal lobes often unequal, short and rounded or deltoid, obtuse; veins numerous, parallel, curved, ascending; midrib and primary veins minutely, but distinctly, puberulous beneath. Peduncle 2½–7 in. (or more ?) long, slender, glabrous. Spathe 1–1¼ in. long, about 5 lin. broad, oblong, subulate-pointed, expanded nearly to the base when in flower, convolute when in fruit, glabrous, green. Spadix 1–1¼ in. long, slender, cylindric; female part 2½–6 lin. long. Ovary depressed-globose; style short; stigma discoid.—Engl. in DC. Monogr. Phan. ii. 435, and Jahrb. xv. 463; Durand & Schinz, Consp. Fl. Afr. v. 476.

Upper Guinea. Fernando Po: creeping on stones at the bank of a river, *Mann*, 104! *Barter*, 2045! Cameroons: on stones in a forest stream, Efulen, *Bates*, 289! Kumba River, north-east of Barombi, *Preuss*, 559! Bipinde, in forest, *Zenker*, 901! in forest to the west of Barombi-ba-Mbu, *Preuss*, 465 (ex *Engler*).

Var. *glabra*, N. E. Brown. Leaves 3–4½ in. long, 1¼–2 in. broad, acute at the base; midrib and veins glabrous beneath.

Upper Guinea. Cameroons: Ambas Bay, *Mann*, xv! by a brook near Barombi, *Preuss*, 422! 1223!

7. **A. hastifolia,** *Engl. in Mitth. Deutsch. Schutzgeb.* ii. (1889) 149. Rhizome creeping, densely leafy at the apex. Leaves erect; petiole about 8 in. long, sheathing for ¼–⅓ its length; blade hastate, its middle lobe about 6½ in. long, 2–2⅓ in. broad, its basal lobes about 2 in. long, ¾ in. broad, linear-lanceolate, obtuse, horizontally spreading. Peduncle 6 in. long. Spathe 2 in. long, ¾ in. broad, oblong, obtuse, decurrent on the peduncle. Spadix 1⅔ in. long, about ¼ in. thick at the middle, tapering towards each end; female part 7–8 lin. long. Ovary depressed-globose; style short; stigma orbicular. Stamens united into a short tube, in all the other species they are united into a

solid cylindrical body.—Jahrb. xv. 462; Durand & Schinz, Consp. Fl. Afr. v. 476; De Wild. & Durand, Contrib. Fl. Congo, i. fasc. 2, 65.

Upper Guinea. Cameroons: Batanga, on stones at the foot of trees, *Braun*, 5 (ex *Engler*).

South Central. Congo Free State: Ncoca, *Demeuse*; at the confluence of the Kasai and Sankuru Rivers, *Laurent* (ex *De Wildeman & Durand*).

Var. *sublobata*, Engl. in Engl. Jahrb. xv. 463. Differs from the typical form in having a narrow oblique lobe on the outer side of the basal lobes.—Durand & Schinz, Consp. Fl. Afr. v. 476.

Upper Guinea. Togoland: at Jego, *Kling*, 36 (ex *Engler*).

I have not seen this species.

Imperfectly known species.

8. **A. nana,** *Engl. in Engl. Jahrb.* xxvi. 423. Rhizome creeping, internodes short. Leaves small; petiole $1\frac{1}{4}$–$1\frac{2}{3}$ in. long, sheathing to the middle or beyond; blade about $2\frac{1}{3}$ in. long, $1\frac{1}{6}$–$1\frac{1}{3}$ in. broad, ovate-lanceolate, acute, cordate at the base; veins numerous, curved, ascending. Peduncle 2–$2\frac{1}{3}$ in. long. Spathe $\frac{3}{4}$–1 in. long, lanceolate, acuminate, slightly convolute, pale green. Spadix longer than the spathe, cylindric; female part $3\frac{1}{2}$ lin. long; male part 7 lin. long. Ovary depressed-globose.—Notizbl. K. Bot. Gart. Berl. ii. 281.

Upper Guinea. Cameroons: Victoria, *Lehmbach*.

I have not seen this species, but, judging from the description, I think it is probably a small state of the variable *A. Barteri*, Schott.

17. **CALLOPSIS,** Engl. in Notizbl. K. Bot. Gart. Berl. i. 27.

Spathe expanded to the base, persistent. Spadix monœcious, shorter than the spathe, covered with unisexual flowers, without an appendix or neuter organs; female part adnate throughout to the spathe, unilateral; male part free, a short distance from the female part, cylindric. Perianth none. Female flowers few, laxly subbiseriate; ovary 1-celled; style short, conoid; stigma small; ovule solitary, basal, anatropous; staminodes none. Anthers of male flowers sessile or subsessile, crowded into a cylindric spike, subquadrate, 2-celled; cells opposite, subovoid, opening at the apex by a confluent oval pore.—A herb with a creeping rhizome, and petiolate entire cordate leaves. Peduncle as long as the petioles.

An endemic monotypic genus.

Engler places this genus in the tribe *Pothoideæ*, but in my opinion it should be placed in the tribe *Zomicarpeæ*, and stand next to *Zomicarpella*, from which it differs chiefly in habit and in having no appendix to the spadix, and is certainly more nearly allied to that genus than any other known to me. The two other genera belonging to the *Zomicarpeæ* are natives of Tropical America, and *Callopsis* is therefore interesting as forming another connecting link between the African and American Floras.

1. **C. Volkensii,** *Engl. in Notizbl. K. Bot. Gart. Berl.* i. 27. Rhizome slender, creeping; internodes very short. Roots crowded,

thick and fleshy. Leaves glabrous; petiole 3–5 in. long; blade $3\frac{1}{4}$–$5\frac{1}{4}$ in. long, 2–$3\frac{1}{4}$ in. broad, cordate-ovate, obtuse, apiculate; basal lobes up to $\frac{3}{4}$ in. long, rounded. Peduncle 3–$3\frac{1}{2}$ in. long, erect, glabrous. Spathe 1–$1\frac{1}{4}$ in. long, $\frac{3}{4}$–1 in. broad, elliptic or elliptic-obovate, apiculate (ovate, acuminate, *Engler*), cuneate at the base and shortly decurrent on the peduncle, expanded at the base, white, glabrous. Spadix slender, shorter than the spathe; male and female parts shortly separated, female adnate to the spathe, unilateral. Ovaries 3–12, laxly subbiseriate, elongate-ovoid, narrowed into a short style; stigma discoid. Anthers crowded in a slender terete spike about 5 lin. long, 1 lin. thick. —Engl. in Pfl. Ost-Afr. C. 131.

Mozamb. Dist. German East Africa: Usambara; at the foot of trees in virgin forest, on Msasa Mountain, between Nderema and the River Sigi, about 2500 ft., *Volkens*, 49!

18. **STYLOCHITON**, Leprieur; Benth. et Hook. f. Gen. Pl. iii. 969.

Spathe connate into a tube below, or nearly to the top, at length entirely deciduous. Spadix free, monœcious, usually with a naked space between the male and female parts, or the base of the male spike more or less interrupted, without neuter organs or appendix. Female flowers in a single cycle or in 2–5 (or more ?) series or spirals, crowded, free or connate, laterally compressed or angular from mutual pressure, the uppermost often imperfectly hermaphrodite. Perianth gamophyllous, cupular or suburceolate, truncate, often with a thickened margin. Staminodes none. Ovary superior or inferior, often very oblique, 1-celled with basal placentation or 2 parietal placentas, or 2–4-celled in the lower part with axile placentation; style exserted; stigma discoid-capitate, or oblique and ovate or lanceolate. Ovules 2 to several in each cell, anatropous, surrounded by mucilage. Male flowers numerous, in a cylindric spike, crowded or lax. Perianth as in the female flowers, but less deep, and not contracted at the mouth, or rarely 3–5-lobed, often laterally compressed. Stamens 3–4, rarely fewer, free, inserted at the base of a rudimentary ovary, exserted; filaments filiform or clavate; anthers basifixed, with oblong or elliptic parallel or divergent cells, opening by longitudinal slits. Fruit not seen, described as a berry containing 2 to several ovoid slightly compressed seeds, with a thin black striated testa, copious fleshy albumen, and an elongated fleshy axile embryo.—Perennial herbs with the habit of an *Arum*. Rhizome usually stout, fleshy, nodose or ringed. Leaves all radical, petiolate, cordate, hastate, sagittate, or rarely entire at the base, contemporary with the flowers or appearing after them. Peduncle terminal or axillary, solitary, or rarely 2 from one axil.

An African genus of about 15 species, two of which are extratropical.

Peduncle and undersurface of the leaves puberulous; leaves very broadly hastate or sagittate . . 1. *S. puberulus*.

Peduncle and leaves glabrous.

*Peduncles arising from the axils of fully developed leaves.

Leaves broadly hastate, greyish beneath, from being densely covered with minute black dots; veins dark	2. *S. salaamicus.*
Leaves not black-dotted beneath; veins of the same colour as the rest of the leaf.	
Leaves large, deeply cordate or cordate-sagittate, with large, broad, obtusely rounded basal-lobes; spathe 5–8 in. long . . .	3. *S. maximus.*
Leaves oblong, subacute, slightly obtuse at the base; spathe about 3 in. long . . .	4. *S. Zenkeri.*
Leaves oblong or elliptic-oblong, obtuse, distinctly cordate at the base, with short rounded basal lobes; spathe $1\frac{3}{4}$–2 in. long	5. *S. gabonicus.*
Leaves narrowly sagittate, with long and narrow basal-lobes; male perianth 4–5-lobed	6. *S. lobatus.*
**Peduncles not axillary; inflorescence either appearing before the leaves, or arising from a separate bud by the side of the leaves. (See also 4, *S. Zenkeri*, under which the position of the peduncle is undescribed.)	
Female flowers 10–12, in two series.	
Stigma discoid; filaments of the stamens clavate, longer than the anthers	7. *S. borumensis.*
Stigma oblique, shield-like; filaments of the stamens shorter than the anthers . .	8. *S. angolensis.*
Female flowers 6–9 or more in one cycle.	
Inflorescence and leaves present at the same time; spathe 2 in. long	9. *S. hypogæum.*
Inflorescence appearing before the leaves; spathe about 4 in. long; male perianth 3-lobed .	10. *S. grandis.*
Female flowers 4–5 in one cycle.	
Ovary adnate to the perianth	11. *S. kerensis.*
Ovary free within the perianth.	
Spathe $1\frac{1}{2}$–$2\frac{1}{4}$ in. long.	
Leaves rounded at the base; style 1 lin. long	12. *S. lancifolius.*
Leaves sagittate at the base; style 2 lin. long; filaments of the stamens slightly exceeding the perianth . . .	13. *S. Barteri.*
Spathe 1–$1\frac{1}{4}$ in. long; style $\frac{3}{4}$ lin. long; filaments of the stamens much exceeding the perianth	14. *S. similis.*

1. **S. puberulus,** *N. E. Br.* Leaves probably contemporary with the flowers; petiole 12–14 in. long, sheathing for $\frac{1}{4}$–$\frac{1}{3}$ of its length, puberulous in the lower part, marked with pale spots; blade as broad as long, very broadly sagittate or hastate, glabrous above, puberulous on the midrib, veins and veinlets beneath; front lobe 5–10 in. long, $4\frac{1}{2}$–9 in. broad, broadly ovate or deltoid-ovate, subacute, with a subulate point 3–4 lin. long; basal lobes $3\frac{1}{2}$–8 in. long, 2–$6\frac{1}{2}$ in. broad, ovate or elliptic-ovate, obtuse, overlapping or widely spreading. Peduncle $2\frac{1}{2}$–4 in. long, puberulous. Spathe and male part of the spadix not seen. Female flowers about 30, in several spirals, only seen in young

fruit, free, horizontal. Perianth apparently cupular, about 1 line deep. Young fruit flat at the apex, scrobiculate and puberulous; stigma sessile.

Mozamb. Dist. British Central Africa: Rhodesia; near Boruma, on the Zambesi, *Menyharth !*

The puberulous leaves and ovaries distinguish this from all the other species of the genus.

2. **S. salaamicus,** *N. E. Br.* Leaves contemporary with the flowers, glabrous; petiole 6–10 in. long, narrowly sheathing for 1–2 in. at the base, apparently not spotted; blade hastate or sagittate-hastate, green above, greyish with dark-coloured veins and minutely dotted with black beneath; front lobe $2\frac{1}{2}$–6 in. long, $2\frac{1}{2}$–$4\frac{1}{2}$ in. broad near the base, oblong or ovate-deltoid, acute; basal lobes $1\frac{3}{4}$–$4\frac{1}{2}$ in. long, 1–2 in. broad at the middle, obliquely-lanceolate or elliptic-oblong, broadest at the middle, obtuse. Peduncle $2\frac{1}{2}$ in. long, solitary, axillary, glabrous Spathe and spadix not seen, broken off.

Mozamb. Dist. German East Africa: Dar es Salaam, *Kirk !*

3. **S. maximus,** *Engl. in Engl. Jahrb.* xv. 466. Leaves about 6, contemporary with the flowers, quite glabrous; petiole 6–12 in. (or more ?) long, sheathing for $\frac{1}{3}$–$\frac{1}{2}$ its length; blade 4–12 in. long, 5–$10\frac{1}{2}$ in. broad, deepiy cordate or cordate-sagittate, acute or obtuse, apiculate; basal lobes elliptic, elliptic-ovate or elliptic-oblong, about half as long as the front lobe, very obtusely rounded at the apex, with an obtuse sinus 2–3 in. deep between them. Peduncle axillary, 2–3 in long, glabrous. Spathe with a tube 2–3 in. long, inflated at the base, cylindric above; limb 3–5 in. long, $\frac{3}{4}$–$1\frac{3}{4}$ in. broad, oblong-lanceolate, acute or acuminate, green outside, dark puce within. Spadix sessile, $2\frac{1}{4}$–3 in. long; female part 5–9 lin. long, of 4–5 crowded spirals of flowers, angular from mutual pressure; male part more or less interrupted in the basal portion, but scarcely separated from the female part by a distinct naked space. Female flowers with a cup-shaped perianth 1 lin. deep, contracted at the mouth, truncate and thickened at the margin, and a subglobose 2-celled ovary with axile placentation and a 1 lin. long style. Male flowers with a laterally compressed perianth $\frac{1}{3}$ lin. deep and exserted stamens with filiform filaments 1 lin. long.—N. E. Br. in Dyer, Fl. Cap. vii. 35; Engl. Pfl. Ost-Afr. C. 132.

Mozamb. Dist. German East Africa: coastland, without mention of precise locality or collector (ex *Engler*).

Also in South Africa.

I have seen no specimen of this from Tropical Africa, and include it on the authority of Engler. The above description is compiled from specimens collected at Delagoa Bay.

4. **S. Zenkeri,** *Engl. in Engl. Jahrb.* xxvi. 424. Rhizome horizontal below, at length ascending; internodes short, but distinct. Leaves dark green above, pale beneath; petiole 8–12 in. long, sheathing for 2–$2\frac{1}{2}$ in.; blade about 6 in. long, $2\frac{1}{2}$ in. broad, oblong, subacute,

slightly obtuse at the base. Peduncle $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, slender. Spathe-tube 1 in. long, $\frac{1}{4}$ in. diam., cylindric, yellowish-white; limb about 2 in. long, $\frac{3}{4}$ in. broad, lanceolate, dull violet. Spadix sessile. Female flowers 2–3, in one cycle. Perianth shortly cup-shaped, $1\frac{1}{2}$ lin. broad. Ovary 1 lin. high, depressed globose; stigma thick, discoid, $1\frac{1}{4}$ lin. broad. Male spike densely many-flowered, a short distance from the female flowers. Perianth very short. Filaments of the stamens a little shorter than the anthers.

Upper Guinea. Cameroons: in wet shady places on the banks of a brook near Yaunde, *Zenker & Staudt*, 338.

Allied to *S. lancifolius*, Kotschy, according to Engler, who does not state if the leaves appear with or after the flowers; but as specimens of *S. gabonicus*, N. E. Br., have been distributed from Berlin under the name of *S. Zenkeri* (with the description of which they do not agree), it is assumed in the key to the species that *S. Zenkeri* somewhat resembles *S. gabonicus*, and like that species has axillary peduncles. I have not seen it.

5. **S. gabonicus,** *N. E. Br.* Rhizome creeping, about $\frac{1}{4}$ in. thick; roots moderately stout, but scarcely fleshy, branching. Leaves contemporary with the flowers, glabrous; petiole $3\frac{1}{2}$–$9\frac{1}{2}$ in. long, sheathing for about $\frac{1}{4}$ of its length; blade $4\frac{1}{2}$–7 in. long, $2\frac{1}{2}$–$4\frac{3}{4}$ in. broad, oblong or elliptic-oblong, obtuse, narrowed below the middle to a cordate base, with obtusely rounded lobes $\frac{1}{4}$–1 in. long, under surface minutely freckled with pale brown in the dried state. Peduncle $\frac{3}{4}$–1 in. long, slender, axillary, solitary. Spathe not subterranean; tube very short, 3–4 lin. long, slightly inflated at the base; limb $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, 6–8 lin. broad, oblong-ovate, obtuse, mucronulate, concave. Spadix 6–8 lin. long. Female flowers 4, horizontal, free. Perianth cupular, truncate, with a thickened rim, laterally much compressed, its longest diam. $1\frac{1}{4}$ lin., about $\frac{1}{2}$ lin. deep. Ovary free, laterally compressed, shorter than the perianth; style about $\frac{1}{3}$ lin. long, shortly exserted, stout, horizontally spreading; stigma capitate. Male spike rather dense, about $\frac{3}{4}$ lin. distant from the female flowers. Perianth cupular, truncate, much compressed, and pointed at each end, about $\frac{1}{4}$ lin. deep. Stamens 4; filaments moderately stout, shortly exserted from the perianth; anthers with 4, somewhat radiating lobes (cells).

Upper Guinea. Fernando Po, *Barter*, 1470! Cameroons: Bipinde, in the forest, *Zenker*, 1936! 2013!

Lower Guinea. Corisco Bay: Mount John, River Kongui, *Mann*, 1880! Gaboon: Gaboon River, *Mann*, 1042!

According to Barter, the Fernando Po plant has a light pink spathe, his specimen is without flowers, but appears to be the same as the Gaboon plant. The specimens collected by Zenker at Bipinde (1936, 2013) were received from Berlin under the name of *S. Zenkeri*; they are identical with those collected by Mann, and do not agree with Engler's description of *S. Zenkeri*, which is said to have the leaves slightly obtuse (obtusiuscula) at the base, and a spathe with a tube 1 in. long, and a limb 2 in. long, $\frac{3}{4}$ in. broad.

6. **S. lobatus,** *N. E. Br.* Leaves contemporary with the flowers, glabrous; petiole 6–10 in. long, broadly sheathing for about half its

length, variegated on the sheath with irregular transverse bars; blade sagittate or sagittate-hastate; front lobe 4–6 in. long, 1–1¼ in. broad, dilating where it joins the basal lobes, narrowly oblong or strap-shaped, obtuse, apiculate; basal lobes 2–4½ in. long, 5–11 lin. broad, narrowly-oblong or strap-shaped, obtuse. Peduncle 2–2½ in. long, moderately stout, glabrous, axillary, 2 from the same axil in the specimen seen, accompanied by a membranous linear-oblong subacute bract about 1¾ in. long. Spathe not subterranean, glabrous; tube 1¼ in. long, inflated at the base; limb about 2½ in. long, expanded, oblong-lanceolate. Spadix 3 in. long, curving forwards at the apex. Female flowers about 10 in two series, free; perianth 2 lin. long, obliquely ovoid-urceolate, mouth obliquely truncate; ovary free, obliquely ovoid, narrowed into an erect exserted style 1½ lin. long, thickened or jointed a little below the very oblique ovate stigma. Male spike about ¼ in. distant from the female flowers, not very dense; basal part laxly covered with abortive flowers, in which both stamens and ovary are rudimentary and enclosed in a subglobose-urceolate perianth. Perianth of perfect male flowers about ⅔ lin. deep, subcampanulate, 4–5-lobed to half-way down; lobes narrow, acute or subacute, spreading. Stamens 4; filaments ¾–1 lin. long, clavate, exserted; anthers oblong, basifixed or subadnate.

Mozamb. Dist. German East Africa: without precise locality, *Steere!*

This species is allied to *S. natalensis*, Schott, but is readily distinguished by the narrower and longer lobes of the leaf, and fewer series of female flowers.

7. **S. borumensis,** *N. E. Br.* Rhizome thick, fleshy, nodose, with thick fleshy simple roots. Leaves appearing after the flowers, glabrous: petiole 4–7 in. long; blade sagittate or sagittate-hastate; front lobe 2½–6 in. long, ¾–1¾ in. broad, elongate-oblong acute; basal lobes 1–2½ in. long, 4–9 lin. broad, elongate-deltoid or deltoid-lanceolate, obtuse. Peduncle 1½–1¾ in. long, glabrous, surrounded by 2–3 membranous bracts 1–1¼ in. long. Spathe partly subterranean (?), glabrous; tube 1¼–1¾ in. long, cylindric, slightly inflated at the base; limb or mouth very oblique, 6–8 lin. long, acute. Spadix 1–1⅓ in. long, reaching to about the mouth of the tube. Female flowers 10–12, irregularly bicyclic, free, those of the upper cycle mostly imperfect; perianth about ½ lin. deep, compressed or globose-polygonal, very much contracted at the mouth, somewhat oblique. Ovary free, shortly ovoid, laterally compressed; style ½ lin. long, subhorizontally spreading, stout, shortly exserted beyond the perianth; stigma large, discoid. Male spike about 1 lin. distant from the female flowers, dense; perianth cupular, truncate, ¼–⅓ lin. deep; stamens 4; filaments ¾ lin. long, clavate, very stout; anther-cells slightly divergent.

Mozamb. Dist. British Central Africa: Zambesi Valley; in valleys near Boruma, *Menyharth*, 920!

This species is remarkable for the very thick clavate filaments of the stamens.

8. **S. angolensis,** *Engl. in Engl. Jahrb.* xv. 465. Leaves appearing after the flowers. Peduncle 1 in. long, surrounded by 4 membranous

bracts $\frac{2}{3}$–1 in. long. Spathe-tube $1\frac{1}{4}$ in. long, cylindric; limb $\frac{3}{4}$ in. long, $\frac{1}{2}$ in. broad, expanded, oblong, shortly acuminate, blackish-purple inside. Spadix a little shorter than the spathe-tube. Female flowers about 10, in two cycles. Perianth $\frac{1}{2}$ lin. long, cupular, purplish. Ovary free, subglobose; style 1 lin. long, exserted; stigma oblique, shield-like, Male spike interrupted at the base, dense. Perianth saucer-shaped. Filaments of the stamens shorter than the shortly ovate anthers.—Durand & Schinz, Consp. Fl. Afr. v. 478.

Lower Guinea. Angola: Malange, *Teusz*, 302.

I have not seen this plant, the leaves of which appear to have been unknown to Engler, but I think it probable that specimens in leaf and fruit collected by Welwitsch may belong to this species; I therefore give the following description, compiled from the specimen and notes made by Welwitsch in the British Museum: Rhizome fleshy, with thick, fleshy, simple roots. Leaves appearing after the flowers, green above, glaucous-pruinose beneath, glabrous; petiole 5–6 in. long, spotted with purple; blade 4–5 in. long, $2\frac{3}{4}$–$3\frac{1}{4}$ in. broad at the insertion of the petiole, deltoid- or ovate-deltoid-sagittate, shortly and rather abruptly acuminate; basal lobes broadly deltoid, obtuse, with a broad triangular sinus $\frac{3}{4}$–$1\frac{1}{4}$ in. deep between them; veins very conspicuous. Spathe and spadix not seen. Peduncle short. "Berries densely glomerated in a shortly pedunculated head, subterranean, white, angulate-subpyriform, umbonate with the remains of the stigma, 2-celled, cells 1-seeded (*Welwitsch*)."—*Stylochiton natalensis*, Engl. Araceæ No. 71. *S. natalense*, Rendle in Cat. Afr. Pl. Welw. ii. 86, not of Schott.

Lower Guinea. Angola: Pungo Andongo: growing among bushes near streams between Quilanga and Catete, 2400–3800 ft., *Welwitsch*, 231!

9. **S. hypogæum,** *Leprieur in Ann. Sc. Nat. sér.* 2, ii. 185, *t.* 5. Rhizome horizontal, about $\frac{1}{2}$ in. thick, fleshy, with thick fleshy simple roots. Leaves 5–8 to a plant, contemporary with the flowers; petiole 3–6 in. long, yellowish-green spotted with purplish-violet, the sheathing part subterranean; blade hastate or hastate-sagittate, as long as the petiole; front lobe oblong-lanceolate, acuminate; basal lobes somewhat spreading, oblong acute, about $\frac{1}{3}$ as long as the first lobe. Spathe very shortly pedunculate, arising from the rootstock by the side of the leaves, 2 in. long; tube subterranean, cylindric, slightly inflated at the base; limb ovoid, acute, with a narrow mouth on one side. Spadix shortly protruding from the mouth of the spathe. Female flowers 6–9 or more (in one cycle?), adnate to the base of the spadix, connate. Perianth adnate to the apex of the ovary (?), with a short free oblique urceolate limb. Ovary inferior (?); style moderately slender, much exserted, erect, "articulated" (thickened) below the middle. Fruit subterranean, consisting of the connate ovaries, fleshy, included in the dilated base of the spathe.—Blume, Rumphia, i. 88; Kunth, Enum. iii. 13; Schott, Synop. Aroid. 132, Aroideæ, i. 10, and Prod. Aroid. 345; Hook. Niger Fl. 527. *S. hypogæus*, Engl. in DC. Monogr. Phan. ii. 522; Durand & Schinz, Consp. Fl. Afr. v. 479 partly.

Upper Guinea. Senegambia: on sand-hills, in the districts of Cayor, Oualo and Cape Verd, *Leprieur.*

I have not seen this species.

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10. **S. grandis,** *N. E. Br.* Rhizome stout, nodose, with thick fleshy simple roots. Leaves not seen, appearing after the flowers. Spathe subsessile, enclosed below in several ovate-lanceolate acute membranous bracts 1–2½ in. long; tube subterranean, 3 in. long, ½ in. in diam., cylindric, inflated at the base; limb about 1 in. long, ovoid, apiculate, with an oblique mouth on one side. Spadix shortly protruding from the mouth of the spathe, about 3½ in. long. Female flowers 9, in one cycle. Perianth 4 lin. long, cohering with those on each side and adnate to the ovary on the side next the axis, dorsally free and a little inflated, mouth very oblique, acute at the apex. Ovary ovoid tapering upwards, about as long as the perianth; style stout, erect, exserted about 3 lin. from the perianth; stigma large, obliquely ovate. Male spike about ¾ in. distant from the female flowers. Perianth divided almost to the base into 3, more or less unequal, obtuse lobes 1 lin. long, ¾ lin. broad, those of the upper flowers smaller. Stamens 1–3; filaments filiform, about ¾ lin. long, shorter than the perianth-lobes; anthers subquadrate.

Nile Land. Somaliland: Hahi, *James & Thrupp!*

This very distinct species has a larger spathe than any other of the group producing leaves and flowers at different times, and is remarkable on account of the lobed perianth of the male flowers, a character which also occurs in *S. lobatus.*

11. **S. kerensis,** *N. E. Br.* Rhizome thick and fleshy, emitting thick fleshy simple roots, and clothed in the upper part with the fibrous remains of the leaf-sheaths. Leaves produced after the flowers, glabrous; petioles 2½–6 in. long, sheathing for about half their length; blade sagittate; front lobe 2½–3¼ in. long, ¾–1 in. broad, oblong-lanceolate, acuminate; basal lobes 10–14 lin. long, narrowly oblong, obtuse, somewhat spreading. Peduncle ¼–½ in. long, and together with the base of the spathe enclosed in 3–4 sheaths. Spathe-tube subterranean, 1–1½ in. long, cylindric, inflated at the base; limb about 4 lin. long, hood-shaped, obtuse, apiculate. Spadix protruding 3–4 lin. from the mouth of the spathe and decurved at the apex. Female flowers 5, in one cycle, very oblique, connate. Perianth 3 lin. long, adnate to the ovary below, with only the oblique cupular or suburceolate limb free. Ovary inferior; style 1–1⅓ lin. long, incurved, shortly exserted, moderately stout. Male spike shortly distant from the female flowers, somewhat lax below, more crowded upwards. Perianth cupular, ⅕–⅓ lin. deep, truncate and slightly thickened at the rim. Filaments of the stamens ½ lin. long, filiform; anthers subquadrate; cells parallel.—*S. hypogæus,* Engl. in DC. Monogr. Phan. ii. 522 partly; Martelli, Fl. Bogos. 89; Durand & Schinz, Conspect. Fl. Afr. v. 479 partly.

Nile Land. Eritrea: Keren, 4500 ft., *Beccari,* 77! 167!

Possibly the plant collected in Kordofan at Melbes by Pfund (761), quoted by Engler (Jahrb. xv. 464) under *S. hypogæum,* Lepr., may belong here.

12. **S. lancifolius,** *Kotschy & Peyr. Pl. Tinn.* 42, *t.* 20. Leaves appearing after the flowers; petiole 2½–4 in. long, the sheathing portion subterranean; blade 3–4 in. long, 1–1½ in. broad, elliptic-oblong or

lanceolate-elliptic, acute, rounded or obtuse at the base. Peduncle $\frac{1}{2}$–$\frac{3}{4}$ in. long, enclosed by several membranous ovate bracts about 1 in. long. Spathe-tube 8–9 lin. long, subterranean; limb $\frac{3}{4}$–$1\frac{1}{2}$ in. long, ovate, acuminate, with a very oblique mouth, green. Spadix 1–$1\frac{1}{2}$ in. long, shortly protruding from the mouth of the spathe. Female flowers 5, in one cycle, erect, free. Perianth 1 lin. long, urceolate, subcrenate at the slightly oblique apex. Ovary free, ovoid, narrowed into a 1 lin. long exserted style. Male spike moderately lax, distant from the female flowers. Perianth very short, cupular, truncate. Filaments of the stamens $\frac{3}{4}$–1 lin. long, filiform, much exserted from the perianth; anthers subquadrate.—Engl. in DC. Monogr. Phan. ii. 523; Engl. Jahrb. xv. 464; Engl. & Prantl, Pflanzenfam. ii. iii. 142, fig. 91; Durand & Schinz, Conspect. Fl. Afr. v. 479.

Nile Land. British East Africa: Jur; near the River Dembo, *Tinne*, 10; Abu Guroon's Seriba, *Schweinfurth*, 1553 (ex *Engler*), in woods by the River Jur, *Schweinfurth*, 1587 (ex *Engler*); Jur Ghattas, *Schweinfurth*, 1858 (ex *Engler*); and at Kurshook (Kutschuk) Ali's Seriba, *Schweinfurth*, ser. iii. 199! Bongo (Bogosland by error): in the Steppe to the south of the River Lesi (Lebsis by error), *Schweinfurth*, ser. iii. 200 (ex *Engler*). Niamniam; at Makporru Hill, *Schweinfurth*, 3740 (ex *Engler*).

I have not seen leaves of this plant.

13. **S. Barteri,** *N. E. Br.* Leaves sagittate (*Barter*), appearing after the flowers. Spathe very shortly pedunculate, about $1\frac{1}{2}$ in. long; tube subterranean, 10 lin. long; limb 7–8 lin. long, oblong, apiculate, with a very oblique mouth, purple. Spadix shorter than the spathe. Female flowers 4–5, in one cycle, scarcely cohering or easily separated. Perianth 2–$2\frac{1}{4}$ lin. long, urceolate, obliquely truncate at the mouth. Ovary free, ovoid; style 2 lin. long, slender, much exserted. Male spike distant from the female flowers. Perianth $\frac{1}{2}$–$\frac{2}{3}$ lin. deep, cupular, truncate. Filaments of the stamens scarcely exceeding the perianth $\frac{1}{2}$–$\frac{2}{3}$ lin. long, filiform; anthers subquadrate.

Upper Guinea. Lagos: Yoruba; at Oyo, *Barter*, 3424!

There are no leaves with the specimen, but in all probability a leafy specimen, without flowers, collected by *Barter* (1472) in Nupe, growing in moist ground, may belong to this species; its characters are as follows.—Petiole 7–10 in. long, sheathing for 3–$3\frac{1}{2}$ in.; blade sagittate or sagittate-hastate, glabrous; front lobe $3\frac{1}{4}$–$6\frac{1}{2}$ in. long, $\frac{2}{3}$–$1\frac{1}{2}$ in. broad at the base, thence gradually tapering to an acute mucronate apex; basal lobes $1\frac{3}{4}$–$2\frac{3}{4}$ in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. broad at the base, linear-oblong or narrowly lanceolate-oblong, obtuse.

14. **S. similis,** *N. E. Br.* Leaves not seen. Spathe appearing before the leaves, 1–$1\frac{1}{4}$ in. long; tube subterranean, 6–7 lin. long, slightly inflated at the base; limb hooded, 6–7 lin. long, apiculate at the apex, with a lateral or very oblique mouth. Spadix slightly protruding from the mouth. Female flowers 4–5, in one cycle, erect, nearly free. Perianth 1–$1\frac{1}{4}$ lin. long, broadly urceolate. Ovary free within the perianth, depressed-globose; style $\frac{3}{4}$ lin. long, stout, very shortly exserted. Male spike distant, rather dense. Perianth $\frac{1}{3}$ lin. deep,

cupular, truncate. Filaments of the stamens much exceeding the perianth, $\frac{2}{3}$–$\frac{3}{4}$ lin. long, filiform; anthers subquadrate.

Upper Guinea. French Guinea: Sangara; in sandy alluvium at Farana on the River Niger, 3300 ft., *Scott-Elliot*, 5373 !

19. **ZAMIOCULCAS**, Schott; Benth. et Hook. fil. Gen. Pl. iii. 993.

Spathe convolute at the base; limb horizontally spreading or somewhat reflexed. Spadix free, sessile, monœcious, stout, shorter than the spathe, constricted above the ovaries, without neuter organs or appendix; female part short, cylindric; male part cylindric or subclavate, obtuse, closely contiguous to the female, with the lower flowers abortive. Perianth-segments 4, present in both sexes, thickened at the angular truncate apex. Female flowers: Stamens none. Ovary subglobose or ovoid, 2-celled; style short, cylindric; stigma exserted just beyond the perianth, discoid; ovule solitary in each cell, erect, anatropous, on a short funicle. Male flowers with 4 stamens surrounding an abortive ovary, included; filaments short, free; anthers small, 2-celled, slightly connate; cells divergent at the base, opening by transverse slits.—A perennial evergreen herb, with a stout creeping rhizome. Leaves pinnate; petiole with a thickened articulation above the middle. Peduncles short, solitary, axillary.

Endemic, monotypic.

1. **Z. Loddigesii,** *Schott, Synop. Aroid.* 71. Rhizome stout, creeping. Leaves all radical, erect, pinnate, $1\frac{1}{2}$–2 ft. long, including the petiole, glabrous; petiole stout, shortly sheathing at the base, with a swollen articulation above the middle; leaflets opposite or alternate, $3\frac{1}{2}$–$5\frac{1}{2}$ in. long, 1–2 in. broad, oblanceolate, acute, cuneately narrowed to the base from above the middle, articulated to the petiole and at length deciduous. Peduncle $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, 2 lin. thick, glabrous, surrounded by several bracts. Spathe green, glabrous; tube subglobose, about $\frac{1}{2}$ in. long and broad; limb $1\frac{1}{2}$–2 in. long, about 1 in. broad, ovate-oblong, acute, horizontally spreading or reflexed. Spadix stout, about 5 lin. thick, constricted above the female part, very obtuse, whitish; female part $\frac{1}{2}$ in. long; male part 9–11 lin. long. Fruit not seen.—Schott, Prod. Aroid. 214; Decsne in Bull. Soc. Bot. France, xvii. 321; Bot. Mag. t. 5985; Engl. in Nov. Act. Acad. Leopold. Nat. Cur. xxxix. 201, t. 13, fig. 24, in DC. Monogr. Phan. ii. 208, Jahrb. i. 189, and Pfl. Ost-Afr. C. 131; Engl. & Prantl, Pflanzenfam. ii. iii. 117; Lynch in Gard. Chron. 1880, xiv. 375; Durand & Schinz, Conspect. Fl. Afr. v. 472. *Caladium zamiæfolium*, Lodd. Bot. Cab. t. 1408.

Nile Land. British East Africa: Rabai Hills, near Mombasa, *Taylor !*

Mozamb. Dist. Zanzibar, cultivated specimens, *Kirk ! Boivin* (ex *Decaisne*), *Hildebrandt* (ex *Engler*).

Also found in the Island of Bourbon according to Engler.

This plant is remarkable among Aroids in having truly pinnate leaves, with the leaflets articulated to the petiole, which character, however, is also shared by

the very remarkable American genus *Thaumatophyllum*. The leaflets, after falling to the ground, have the property of forming a small tuber at their base, which ultimately developes into a young plant. This peculiarity was first discovered at Kew by Mr. R. J. Lynch in 1874 or earlier, according to a note in the Kew Herbarium, and as stated by him in the Gard. Chron., l.c. Subsequently the same thing was rediscovered by Herr Hild, of Kiel University Botanic Garden, as detailed by Prof. Engler (ll.cc.).

20. **GONATOPUS,** Hook. f. in Bot. Mag. sub t. 6026.

Spathe convolute at the base; limb horizontally reflexed, or revolute. Spadix free, sessile, monœcious, stout, shorter than the spathe, constricted above the ovaries, without neuter organs or appendix; female part short, cylindric, closely contiguous to the long cylindric male part, in which the lowest flowers are more or less imperfect. Perianth-segments 4, present in both sexes, free, somewhat thickened at the angular truncate apex. Female flowers: Staminodes none. Ovary ovoid, 2-celled; style short, stout; stigma exserted just beyond the perianth, peltate, rather large; ovule solitary in each cell, erect, anatropous, with a very short funicle. Male flowers with 4 stamens, connate into a tube around an abortive ovary, included; anthers short and broad, 2-celled; cells opening by terminal introrse pores.—Tuberous-rooted herbs with the habit of an *Amorphophallus*. Leaf solitary, annual, tripinnate in the adult stage, pinnate or bipinnate in young plants; petiole with a thickened articulation at about the middle. Peduncles 1–2 to a tuber, shorter than the petiole, contemporary with the leaf.

An endemic genus of 2 species. Very similar to *Zamioculcas* in floral structure, the only technical difference being that the filaments of the stamens are connate into a tube in *Gonatopus* and free in *Zamioculcas*, the habit, however, is entirely different.

Leaflets varying from lanceolate to elliptic-lanceolate, not decurrent at the base . . . . . 1. *G. Boivinii.*
Leaflets linear or linear-lanceolate, strongly decurrent at the base . . . . . 2. *G. angustus.*

1. **G. Boivinii,** *Hook. f. in Bot. Mag. sub t.* 6026. Tuber depressed 3–5 in. in diam. Leaf solitary, erect, 2–3 ft. high, 3–4-pinnate in the adult state, glabrous; lowest branches 12–15 in. long, 7–8 in. broad; leaflets 1½–3 in. long, 7–15 lin. broad, varying from lanceolate to elliptic-lanceolate, acuminate, rounded or cuneate at the base, shortly petiolulate or subsessile, not decurrent; petiole stout, with a swollen articulation at the middle, green, transversely banded with blackish-green; in juvenile plants the leaf is simply pinnate, with a few large elliptic or suborbicular shortly cuspidate petiolulate leaflets. Peduncles 1–2 to a tuber, produced with the leaf, 15–16 in. long, erect, moderately stout, glabrous, coloured like the petiole and, with the latter, enclosed at the base by 2 or 3 membranous acute sheaths. Spathe glabrous, dull green, striate with dark green outside, pale greenish-yellow inside; tube about 1 in. long, ovoid or subglobose; limb 5–8 in. long, 1½ in.

broad, oblong, acuminate into a long subulate point, expanded, recurved or revolute. Spadix sessile; female part about $\frac{3}{4}$ in. long and about $\frac{1}{2}$ in. thick; male $2\frac{1}{4}$–$3\frac{1}{2}$ in. long, about 5 lin. thick, constricted at the base, with the lowest flowers more or less imperfect. Perianth-segments of both male and female flowers oblong, truncate at the triangular apex. Ovary ovoid, narrowed into a short style, 2-celled; stigma large, peltate, just exserted from the perianth, pea-green. Stamens in the male flowers 4, connate around an abortive ovary, entirely absent in the female flowers; anthers subquadrate, white. Fruit not seen.—Engl. in DC. Monogr. Phan. ii. 209; Pflanzenfam. ii. iii. 117, and Pflanzenw. Ost-Afr. C. 131; Durand & Schinz, Conspect. Fl. Afr. v. 472. *Zamioculcas Boivini*, Decsne. in Bull. Soc. Bot. France, xvii. 321; Hook. f. in Bot. Mag. t. 6026.

Nile Land. British East Africa: Rabai Hills, near Mombasa, *Taylor!*

Mozamb. Dist. Zanzibar, *Boivin* (ex *Decaisne*), *Hildebrandt* (ex *Engler*). German East Africa: coast opposite Zanzibar, cultivated specimens, *Kirk!* British Central Africa: Nyasaland; in the Shire Valley, opposite to the rapids of Zedzane, *Kirk*, 339! Shire Highlands, *Buchanan*, 186! Mount Mlanji, *McClounie*, 51!

Also (according to Engler) in the Island of Réunion.

2. **G. angustus,** *N. E. Br.* Tuber turnip-shaped. Leaf solitary, erect, $1\frac{1}{2}$–$4\frac{1}{2}$ ft. high, tripinnatipartite, glabrous; lowest branches 10–12 in. long, about 5 in. broad; leaflets or ultimate segments $1\frac{1}{4}$–3 in. long, $1\frac{1}{2}$–4 lin. broad, probably sometimes larger, linear or linear-lanceolate, acute, more or less decurrent at the base, not articulated to the rhachis. Peduncle 2–3 in. long, smooth. Spathe glabrous; tube 1–$1\frac{1}{4}$ in. long, oblong-ovoid; limb about 3 in. long, and $1\frac{1}{4}$ in. broad, reflexed, oblong, cuspidate. Spadix sessile, shorter than the spathe; female part 8–9 lin. long, about $\frac{1}{3}$ in. diam. cylindric; male part about $2\frac{1}{2}$ in. long, cylindric, obtuse, its basal portion for about 8 lin. constricted to about half the thickness of the upper portion and covered with abortive flowers. Perianth-segments oblong, truncate at the angular apex. Ovary ovoid, narrowed into a short stout style, 2-celled; stigma rather large, peltate, exserted just beyond the perianth-segments. Stamens in the male flowers 4, connate into a tube around an abortive ovary and equalling it in length, entirely absent in the female flowers.

Mozamb. Dist. British Central Africa: Zambesi Valley; in copses on mountains near Boruma, *Menyharth*, 922*bis!*

21. **CYRTOSPERMA,** Griff.; Benth. et Hook f. Gen. Pl. iii. 997.

Spathe convolute at the very base, open above, ovate-lanceolate, persistent. Spadix free, densely covered with hermaphrodite flowers, without an appendix or neuter organs. Perianth-segments 4–6, free, imbricate, somewhat hooded at the truncate apex. Stamens 4–6; filaments short and broad; anthers short, 2-celled; cells oblong, opening by longitudinal slits, extrorse. Ovary ovoid, 1-celled; stigma

sessile or subsessile, cushion-like. Ovules 2 to several, biseriate on a subbasal parietal placenta, amphitropous, becoming much curved. Berries smooth, 1– to several-seeded. Seeds rounded in outline, compressed, crested; testa crustaceous; albumen fleshy; embryo axile, curved.—Herbs with a tuberous or elongated rootstock. Leaves all radical, sagittate or hastate, usually prickly on the petioles; primary veins rather distant, secondary reticulated. Peduncle solitary, elongated, usually prickly. Spathe large, coloured, longer than the spadix.

A small genus of about 7 species, chiefly natives of Malaya and Polynesia, two species in Tropical America, and the following one in Africa.

1. **C. senegalense,** *Engl. in DC. Monogr. Phan.* ii. 270. A large herb attaining 6–12 ft. in height. Rootstock a large tuber. Leaves glabrous, all radical; petiole several feet in length, prickly; blade sagittate, very variable in size and general outline; front lobe 5 in. to 1 ft. 5 in. long, $2\frac{1}{4}$ in. to 1 ft. 8 in. broad; basal lobes $4\frac{1}{2}$ in. to 1 ft. $4\frac{1}{2}$ in. long, $1\frac{1}{2}$–10 in. broad, all acute or acuminate. Peduncle overtopping the leaves, stout, prickly. Spathe 9–17 in. long, 3–5 in. broad, lanceolate, acuminate, convolute at the very base only, concave-expanded above, yellow-green, striped with rich dark red-brown. Spadix $2\frac{1}{2}$–7 in. long, $\frac{1}{2}$–$1\frac{1}{4}$ in. thick, sessile, cylindric or more or less tapering, obtuse, dark violet. Berries $\frac{1}{2}$ in. long, $\frac{1}{4}$ in. in diam., cuneate-oblong, 2–4-seeded. Seeds 2–3 lin. in diam., roundish, with about 4 series of dentate crests around the circumference, brown; testa moderately thick, crustaceous.—Engl. & Prantl, Pflanzenfam. ii. iii. 123; Mitth. Deutsch. Schutzgeb. ii. 1889, 150; Durand & Schinz, Conspect. Fl. Afr. v. 472; Hook. in Bot. Mag. t. 7617. *C. Afzelii,* Engl. in DC. Monogr. Phan. ii. 269; Engl. & Prantl, Pflanzenfam ii. iii. 123; Durand & Schinz, Conspect. Fl. Afr. v. 472; De Wild. & Durand, Contrib. Fl. Congo, i. fasc. 2, 64. *Lasimorpha senegalensis,* Schott in Bonplandia, 1857, 127; Gen. Aroid. t. 85, fig. 1–10, and Prod. Aroid. 406. *L. Afzelii,* Schott, Gen. Aroid. t. 85, fig. 11–20; and Prod. Aroid. 405. *Philodendron* (?) *sp.*, Hook. Niger Fl. 527.

Upper Guinea. Senegal, *Perrottet,* 763 (ex *Engler*). Senegambia: in inundated places by the Rio Nune, *Heudelot,* 639! Sierra Leone: near N'tunga, by the waterside, and seen at Kambia in marshy ground, *Scott-Elliot,* 4333! Guinea, *Afzelius* (ex *Schott*). Liberia: Grand Bassa, *Vogel,* 94! Niger Territory: Nupe; in a swamp at Gongoroko, *Barter,* 1467! Old Calabar; in a swamp near the Botanic Garden, *Holland,* 64! Cameroons: Batanga, *Braun!* Fernando Po: in swampy places, *Mann,* 244! *Barter,* 9!

Lower Guinea. Lower Congo; Stanley Pool, *Hens,* ser. B, 15!

South Central. Ikatta River, *Demeuse.*

I am quite unable to separate *C. Afzelii* from *C. senegalense;* the globose spadix of the former (as figured by Schott) is evidently only the basal part of a spadix swollen out into this form by the half-developed state of some of the young fruits; and the difference noted in the leaves of the two supposed species is not of specific value, as the breadth of the front and basal lobes of the leaf varies very much in this and allied genera, and is not constant on the same plant at different stages of growth.

Barter states on his labels that the plant grows from 8 to 12 ft. high, and that a single spathe and its stem weighs from 10 to 13 pounds. Other collectors give the height as from 6 to 9 ft.

22. **RAPHIDOPHORA**, Schott; Benth. et Hook. f. Gen. Pl. iii. 992.

Spathe boat-shaped, convolute, rather fleshy, quickly deciduous. Spadix free, sessile, cylindric, shorter than the spathe, everywhere densely covered with hermaphrodite flowers, excepting a few sterile ones at the base. Perianth none. Stamens 4; filaments about as long as the ovary, flattened; anthers slightly exserted, 2-celled; cells more or less divergent at the base, opening by oblique slits which reach to about half-way down. Ovaries obpyramidal, angular from mutual pressure, subtruncate, 1-celled, with 2 much projecting 2-armed placentas, which do not quite meet at the centre; style short or none, flattened or conical; stigma linear-oblong, subquadrate, or circular. Ovules numerous, biseriate, anatropous, affixed by long funicles to the lower part of the placentas, erect or ascending. Fruiting spadix consisting of the enlarged ovaries more or less agglutinated together. Seeds several, small, erect, albuminous; testa thin; embryo seated at the base of the albumen.—Evergreen climbers, rooting at the nodes. Leaves alternate, entire, perforated, pinnatisect, or pinnatipartite, pinnately veined; petioles long, sheathing; primary veins parallel, secondary reticulated. Peduncles axillary or subterminal. Spathe usually rather large, thick, usually falling off a few hours after expansion. In all parts of the plant intercellular hairs are present, and in the ovary and fruit they are exceedingly abundant.

Species between 30 and 40, natives of India, the Malay Archipelago and Australia, with the following 2 in Africa.

Stem slender, $\frac{1}{2}$–1 lin. thick; spathe 7–9 lin. long	1. *R. pusilla.*
Stem stout, $\frac{1}{3}$–$\frac{1}{2}$ in. thick; spathe $3\frac{1}{2}$–$4\frac{1}{2}$ in. long	2. *R. africana.*

1. **R. pusilla,** *N. E. Br. in Kew Bulletin*, 1897, 286. Stem very slender, $\frac{1}{2}$–1 lin. thick in the dried state, rooting at the nodes, glabrous. Leaves large in proportion to the stem, glabrous; petiole 4–$4\frac{3}{4}$ in. long, as thick as the stem, sheathing at the base, thickened at the apex; blade spreading nearly at a right angle from the petiole, 5–$6\frac{1}{2}$ in. long, $1\frac{1}{4}$–$1\frac{3}{4}$ in. broad, somewhat obliquely lanceolate, entire, tapering from about the middle into a long acuminate point, and below the middle to a cuneate acute base; lateral veins numerous, parallel, ascending, slightly curved. Peduncle $1\frac{1}{4}$–2 in. long, slender, glabrous, enclosed in a membranous sheath at its base, and apparently not accompanied by a leaf. Spathe 7–9 lin. long, about $\frac{1}{4}$ in. in diam. in its convolute cylindric stage, abruptly terminated by a subulate point, which is about $\frac{1}{3}$ as long as the rest of the spathe; expanded spathe not seen, very deciduous. Spadix sessile, 4–6 lin. long, 2 lin. thick, cylindric, obtuse. Ovary imperfectly 2-celled; stigma sessile, subquadrate, or elongated transversely to the axis of the spadix. Ovules numerous.

Lower Guinea. Gabcou: Sierra del Crystal, *Mann*, 1700!

2. **R. africana,** *N. E. Br. in Kew Bulletin*, 1897, 286. Stem moderately stout, about $\frac{1}{3}$–$\frac{1}{2}$ in. thick, rooting at the nodes, climbing to a height of 80–100 ft. Leaves glabrous; petiole 6–12 in. long, sheathing for the greater part of its length, thickened at the apex; blade 8–21 in. long, $2\frac{1}{4}$–$4\frac{3}{4}$ in. broad, obliquely elongate-oblong-lanceolate, acuminate, cuneate at the base; lateral veins numerous, parallel, ascending, slightly curved. Peduncles 3–5 in. long, 2 lin. thick, arising near the apex of the branches, in the axils of membranous lanceolate acute bracts, glabrous. Spathe $3\frac{1}{2}$–$4\frac{1}{2}$ in. long, in the convolute stage cylindric, $\frac{3}{4}$–1 in. in diam., produced into a stout beak about an inch long, not seen expanded, very deciduous, white. Spadix sessile $2\frac{1}{2}$–$3\frac{1}{4}$ in. long, $\frac{1}{2}$ in. thick, cylindric, obtuse. Ovary imperfectly 2-celled; style very short and inconspicuous; stigma subquadrate, or elongated parallel to the axis of the spadix. Ovules several, ascending from near the base of the placentas.

Upper Guinea. Sierra Leone: near Kurusu, *Scott-Elliot*, 5524! on humus of wood by a stream near Sakuru, *Scott-Elliot*, 4940! Ashanti: Assin-Yan-Coomassie, *Cummins*, 47! Fernando Po, *Mann*, 103!

ORDER CLI. **LEMNACEÆ.** (By N. E. Brown.)

Flowers seated in a cavity at the margin or in the upper surface of the frond, consisting of 1–2 stamens accompanied by a sessile ovary, either naked or enclosed in a membranous spathe (or perianth?), which ruptures irregularly as the stamens mature. Stamens exserted from the frond; filaments filiform; anthers 1–2-celled; cells subglobose, opening by transverse lateral or terminal slits. Ovary narrowed into a style or with a subsessile stigma, 1-celled; placenta basal; ovule solitary or several in an ovary, anatropous, semi-anatropous, or orthotropous. Fruit 1- to several-seeded, indehiscent or opening transversely. Seeds minute, albuminous; embryo straight, axile.—Small or minute, gregarious, floating plants, consisting of suborbicular, elliptic, obovate, oblong or linear fronds of cellular tissue, with or without rudimentary vessels, usually 2 or more fronds connected together as one plant, flat on both sides or more or less convex beneath, sometimes as thick as broad, developing young fronds (which remain attached to the parent frond for some time) from a cavity (bud-cavity) or cavities placed near or at the basal end of the frond, rootless, or producing one or more roots from the middle of the undersurface.

Genera 2. Species about 28. Found in all warm and temperate countries, floating on still water. For complete accounts of this Order see Hegelmaier, Die Lemnaceen, and in Engler Jahrb. xxi. 268.

Frond with 1 or more roots. Flowers seated in a cavity at the margin of the frond . . .	1. LEMNA.
Frond rootless. Flowers seated in a cavity in the upper surface of the frond	2. WOLFFIA.

1. **LEMNA,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 1001.

Flowers seated in a cavity at the margin of the frond, enclosed in a minute membranous spathe, very minute, very rarely seen in some of the species. Stamens 1–2; anthers 2-celled; cells opening by transverse slits.—Fronds small or minute, with one or more roots from their under surface, floating on still waters, thin and flat, or flat above and more or less convex beneath, suborbicular, elliptic, oblong, obovate or spathulate in outline, entire, or in one species minutely denticulate on the margin; roots tipped with a distinct sheath-like root-cap.

Species about 16. Widely distributed in all the warm and temperate parts of both hemispheres.

Each frond with several roots	1. *L. polyrhiza.*
Each frond with one root only.	
Fronds subrotund, $1\frac{1}{2}$–3 lin. in diam., underside very convex and greenish-white	2. *L. gibba.*
Fronds elliptic or elliptic-oblong, $\frac{3}{4}$–$2\frac{1}{2}$ lin. long, rather thin, flat above, not very convex beneath.	
Root-cap obtuse; root-sheath not winged . .	3. *L. minor.*
Root-cap acute; root-sheath winged . . .	4. *L. paucicostata.*
Fronds elliptic, $\frac{1}{2}$–$\frac{2}{3}$ lin. long, obtusely keeled above	5. *L. æquinoctialis.*

1. **L. polyrhiza,** *Linn. Sp. Pl. ed.* i. 970. Fronds $1\frac{1}{2}$–4 lin. long, $1\frac{1}{3}$–4 lin. broad, elliptic, suborbicular, or somewhat obovate, usually slightly oblique at the basal end, thin, flat above, slightly convex beneath, bright green above, purple beneath; young fronds sessile. Roots several, fascicled on the undersurface of each frond, towards the basal end. Flowers very rarely seen.—*L. polyrrhiza,* Engl. Bot. ed. 3, ix. 23, t. 1897; Reichb. Ic. Fl. Germ. vii. 9, t. 15, fig. 17; Schweinf. Beitr. Fl. Aethiop. 292. *Spirodela polyrrhiza,* Schleid. in Linnæa, xiii. 392; Kunth, Enum. iii. 7; Hegelmaier, Monogr. Lemn. 151, t. 13, figs. 10–16, and t. 14–15, and in Engl. Jahrb. xxi. 284; Engl. & Prantl, Pflanzenfam. ii. iii. 164 and 154, figs. 101, A, 102; Durand & Schinz, Conspect. Fl. Afr. v. 485; Engl. Pfl. Ost-Afr. C. 422.

Upper Guinea. Lower Niger: Onitsa, *Barter,* 583!

Nile Land. British East Africa: Meshra, on the Ghazal River, *Schweinfurth,* 1281! Mpororo district, *Stuhlmann* (ex *Hegelmaier*).

Widely distributed in most warm and temperate regions.

2. **L. gibba,** *Linn. Sp. Pl. ed.* i. 970. Fronds $1\frac{1}{2}$–3 lin. long, and nearly as broad, subrotund or broadly obovate, very thick when alive, flat and bright green above, very convex, greenish-white and somewhat spongy beneath, young fronds sessile. Roots solitary from the undersurface of each frond. Flowers rare.—Engl. Bot. ed. 3, ix. 22, t. 1396; Reichb. Ic. Fl. Germ. viii. 8, t. 14, fig. 16; Hegelmaier, Monogr. Lemn. 145, t. 11–13, and in Engl. Jahrb. xxi. 289; Engl. & Prantl, Pflanzenfam. ii. iii. 164, 154, fig. 101, C, and 160, fig. 106, D; Ball in Journ. Linn. Soc. xvi. 685; Durand & Schinz, Conspect. Fl. Afr. v. 484; Schweinfurth in Bull. Herb. Boiss. ii. App. ii. 53, 105; N. E. Br. in Dyer, Fl.

Cap. vii. 40. *Telmatophace gibba*, Schleid. in Linnæa, xiii. 391; Kunth, Enum. iii. 6.

Nile Land. Eritrea: Asmara, 7800 ft., *Schweinfurth*, 444; Lalamba Lake, near Keren, 5800 ft., *Schweinfurth*, 989; and Mai-Mafales, Dembelas, 5500 ft., *Schweinfurth*, 123 (ex *Schweinfurth*); Mga Hermasi, *Schweinfurth* (ex *Hegelmaier*); near Acrur, 6200 ft., *Schweinfurth & Riva*, 764! Gorge of Degerra, near Saganeiti, 7000 ft., *Schweinfurth & Riva*, 899! above the Lava Valley, 4500 ft., *Schweinfurth*, 1609 (ex *Schweinfurth*).

Also in extratropical Africa, and widely distributed in Europe, Asia and America.

3. **L. minor,** *Linn. Sp. Pl. ed.* i. 970. Fronds $\frac{3}{4}$–$2\frac{1}{2}$ lin. long, $\frac{1}{2}$–$1\frac{1}{2}$ lin. broad, elliptic, elliptic-oblong or somewhat obovate, rather thin, nearly flat on both sides, bright green; young fronds sessile. Root solitary from the under surface of each frond; root-sheath not winged; root-cap obtuse. Ovary flask-shaped, with a distinct curved style. Ovule solitary, semi-anatropous.—Kunth, Enum. iii. 4; Reichb. Ic. Fl. Germ. vii. 8, t. 14; Engl. Bot. ed. 3, ix. 21, t. 1395; Hegelmaier, Monogr. Lemn. 142, t. 9, 10, and in Engl. Jahrb. xxi. 291; Sanio in Verhandl. Bot. Ver. Brandenb. xxv. 87; Durand & Schinz, Conspect. Fl. Afr. v. 484; Schweinfurth in Bull. Herb. Boiss. ii. App. ii. 53, 105; Engl. & Prantl, Pflanzenfam. ii. iii. 164, 154, fig. 101, B, 161, fig. 107, A, B, and 162, figs. 108–9, A; Engl. Pfl. Ost-Afr. C. 133; N. E. Br. in Dyer, Fl. Cap. vii. 40. *L. ovata*, A. Braun ex Krauss in Flora, 1845, 344.

Nile Land. Eritrea: near Halai, 8400 ft., *Schweinfurth*, 124; near Hauati, 7400 ft., *Schweinfurth*, 125; at Ferfer, 3000 ft., *Schweinfurth*, 126; Halibaret, at Baloa, east of Anseba, 4900 ft., *Schweinfurth*, 127; and near Ailet, *Schweinfurth*, 471 (all ex *Schweinfurth*). Abyssinia, *Decandolle* (ex *Hegelmaier*).

Widely distributed through the warm and temperate regions of the earth.

4. **L. paucicostata,** *Hegelmaier, Monogr. Lemn.* 139, *t.* 8. Fronds $\frac{1}{2}$–$1\frac{1}{2}$ lin. long, $\frac{1}{2}$–1 lin. broad, oblong or elliptic, often somewhat oblique at the basal end, rather thin, nearly flat on both sides, bright green; young fronds sessile. Root solitary from the undersurface of each frond; root-sheath winged on each side; root-cap acute. Ovary flask-shaped, with a distinct more or less curved style. Ovule solitary, semi-anatropous. Fruit ellipsoid, longitudinally ribbed.—Engl. & Prantl, Pflanzenfam. ii. iii. 164, 160, fig. C, and 161, fig. C, D; Hegelmaier in Engl. Jahrb. xxi. 294; Rendle in Cat. Afr. Pl. Welw. ii. 91; Martelli, Florul. Bogos. 89; Engl. Pfl. Ost-Afr. C. 422; Durand & Schinz, Conspect. Fl. Afr. v. 485. *L. minor*, Hegelmaier in Journ. Bot. 1865, 112, not of Linn.

Nile Land. Eritrea: Bogos, *Beccari* (ex *Hegelmaier*). Kordofan: Tulah Habsce, *Pfund*, 430! White Nile, near Jebel Nyemati, *Schweinfurth*, 1011! and at the mouth of the Bahr-el-Jebel, *Schweinfurth*, 1127! Abyssinia, *Martelli* (ex *Hegelmaier*). British East Africa: Jur; Kurshook-Ali's Seriba, *Schweinfurth*, 1725! Mpororo district, *Stuhlmann* (ex *Hegelmaier*); Fimbine, near Rabai, *Hildebrandt* (ex *Hegelmaier*).

Lower Guinea. Angola: Ambriz; in the Lagoa de Quizembo on the right

of the River Loge, and in nearly stagnant streamlets near Ambriz, *Welwitsch*, 208. Loanda; in deep ponds near Bemposta, *Welwitsch*, 205 partly! Icolo e Bengo; in a lake called Lagoa de Quilunda, near Prata, and in lakes in the Libongo district, on the left bank of the River Lifune, *Welwitsch*, 213. Mossamedes; in deep ponds at the mouth of the River Giraul, and near Aguada, *Welwitsch*, 207!

Mozamb. Dist. German East Africa: Usambara; Lutindi, *Holst*, 3441! Usaramo; Bagamoyo, *Hildebrandt*, 1279! Portuguese East Africa: Quilimane *Stuhlmann* (ex *Hegelmaier*).

Widely distributed through the warmer parts of the earth.

This species is very similar to *L. minor*, Linn., and not easily distinguishable in the dried state without careful examination. The fronds, however, are smaller, and the root-cap more acute than in *L. minor*, and the root-sheath has a wing on each side of it, which is wanting in *L. minor*.

5. **L. æquinoctialis,** *Welw. Apont.* 578. Fronds very small, $\frac{1}{2}$–$\frac{2}{3}$ lin. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad, elliptic or elliptic-obovate, "somewhat fleshy, slightly convex, obtusely keeled longitudinally on the upper face, ellipsoid at both ends, minutely but distinctly corniculate. Flowers emerging from a marginal slit" (*Welwitsch*). Root solitary from near the basal end of the underside of each frond. Fruit ellipsoid, ribbed.—Hegelmaier, Monogr. Lemn. 142; Rendle in Cat. Afr. Pl. Welw. ii. 91. *L. angolensis*, Welw. ex Hegelmaier in Journ. Bot. 1865, 112; Hegelmaier, Monogr. Lemn. 141, t. 7, figs. 9–17, and in Engl. Jahrb. xxi. 296; Durand & Schinz, Conspect. Fl. Afr. v. 484; Engl. Pfl. Ost-Afr. C. 422.

Nile Land. British East Africa: Niamniam; at Makporru Hill, *Schweinfurth*, 3740! at the River Ibba, near Nyanye, *Schweinfurth*, 3986! Uganda; Manyonyo (Manjonga), *Stuhlmann* (ex *Hegelmaier*).

Lower Guinea. Angola: Loanda; in deep ponds near the town of Loanda *Welwitsch*, 206!

In the dried state I find the longitudinal keel on the upper surface to be much more evident in Schweinfurth's specimens than in those of Welwitsch.

2. WOLFFIA, Horkel; Benth. et Hook. f. Gen. Pl. iii. 1001.

Flowers seated in a cavity or in two separate cavities in the upper surface of the frond, without a spathe, microscopic, rarely seen. Stamen 1; anther 1-celled, opening by a slit across the top and the valves becoming reflexed.—Fronds small or minute, thin and flat, or as thick as broad, subglobular, hemispherical, ellipsoid, elliptic, oblong or linear, entire or rarely toothed at the margin or end of the frond, entirely destitute of roots, but in two species the lower lip of the cavity from which the young frond emerges is produced into a moderately long flat hyaline process that might easily be mistaken for a root; this process is a development of the stalk by which the young frond is attached to its parent, and which elongates extraordinarily after their separation.

Species 12, widely distributed in all the warm and temperate parts of the earth.

Frond with a colourless process from the lower edge of the bud-cavity.
  Frond always distinctly denticulate on the margin; colourless process about 4 times as long as the frond and not half as broad . . . . . 1. *W. repanda.*
  Frond entire, or occasionally denticulate; colourless process about twice as long as the frond and $\frac{2}{3}$ as broad . . . . . 2. *W. Delilii.*
Frond without a colourless process.
  Frond 2–3 lin. long, very thin, pellucid, undulated . 3. *W. Welwitschii.*
  Frond minute, $\frac{1}{4}$–$\frac{1}{3}$ lin. long, thick.
    Frond nearly as broad as long, flattish above . 4. *W. Michelii.*
    Frond much longer than broad, convex above . 5. *W. cylindracea.*

1. **W. repanda,** *Hegelmaier in Journ. Bot.* 1865, 113. Frond minute, $\frac{1}{2}$ lin. long, $\frac{1}{3}$ lin. broad, elliptic-oblong, thin, flat above, convex beneath (convex on both sides, ex *Welwitsch*), denticulate on the margin, producing from the lower edge of the cavity from which the young frond emerges a flat linear colourless process, resembling a root, about 4 times as long as the individual fronds. Flower in the centre of the upper surface of the frond. Fruit about $\frac{1}{6}$ lin. long, ellipsoid. —Hegelmaier, Monogr. Lemn. 129, t. 4, fig. 20–30, and in Engl. Jahrb. xxi. 301; Durand & Schinz, Conspect. Fl. Afr. v. 485; Engl. & Prantl, Pflanzenfam. ii. iii. 164, and 154, fig. 101, H; Rendle in Cat. Afr. Pl. Welw. ii. 92.

Lower Guinea. Angola: Loanda; plentiful in deep ponds near Bemposta, mixed with *Lemna paucicostata*, Hegelm., *Welwitsch*, 205!

In two of Hegelmaier's figures and in that of Engler & Prantl's Pflanzenfamilien, the curious root-like process is erroneously represented as arising near the middle of the undersurface of the young frond; this is never the case. This process is, in reality, nothing more than the stalk that attaches the young frond to its parent, which, after their separation, elongates in a remarkable manner to fully 4 times the length of the frond, and somewhat resembles a root, but has no root-cap, and cannot in any sense be regarded as a root.

2. **W. Delilii,** *Schleid. in Linnæa,* xiii. 390. Frond very small, 1 lin. long, $\frac{3}{4}$ lin. broad, elliptic or elliptic-oblong, thin, flat, very obtusely rounded at the end, entire or occasionally minutely denticulate, producing from the lower edge of the cavity from which the young frond emerges a broad flat linear colourless process, about twice as long as the individual fronds, and $\frac{2}{3}$ as broad. Flower seated in the upper surface of the frond a little to one side of the middle, and nearest the basal end, according to Hegelmaier's figures.—Kunth, Enum. iii. 4. *W. hyalina*, Hegelmaier, Monogr. Lemn. 128, t. 4, figs. 11–19, and in Engl. Jahrb. xxi. 301; Engl. Pfl. Ost-Afr. C. 423; Engl. & Prantl, Pflanzenfam. ii. iii. 164, and 154, fig. 101, F, G; Durand & Schinz, Conspect. Fl. Afr. v. 485. *Lemna hyalina*, Del. Fl. Ægypt. 27.

Nile Land. Darfur: Surudj district, in fresh-water pools on Gebel Barkin, *Pfund* (ex *Hegelmaier*). Kordofan: Bara, *Pfund*, 235!

Mozamb. Dist. German East Africa: Ugogo; Ngangadra, *Stuhlmann* (ex *Hegelmaier*).

Also in Lower Egypt.

3. **W. Welwitschii,** *Hegelmaier in Journ. Bot.* 1865, 114. Frond small, 2–3 lin. long, 1–2 lin. broad, oblong, broadly or subtruncately rounded at the ends, undulated or with one or more folds along each side, entire, very thin, almost membranous in the dried state, pale green, pellucid. Flowers in two cavities on the upper surface of the frond near the basal end on either side of the middle line, very minute; ovary flask-shaped. Fruit about $\frac{1}{4}$ lin. long, ellipsoid, smooth.—Hegelmaier, Monogr. Lemn. 130, t. 4, figs. 1–10, and in Engl. Jahrb. xxi. 300; Engl. and Prantl, Pflanzenfam. ii. iii. 164 and 160, fig. 105, C; Durand & Schinz, Conspect. Fl. Afr. v. 485; Rendle in Cat. Afr. Pl. Welw. ii. 92. *W. conguensis*, Welw. ex Trimen in Journ. Bot. 1866, 221.

Lower Guinea. Angola: Ambriz; in the lakes of Quizembo, and in lakes and stagnant pools not far from the sea, between Ambriz and the mouth of the River Congo, *Welwitsch*, 209!

Also in Venezuela and Cuba.

Welwitsch appears not to have seen fruit of this species, but I have found a specimen with fruit among the very small quantity examined.

4. **W. Michelii,** *Schleid. Beitr. Bot.* 233. Frond minute, $\frac{1}{4}$–$\frac{1}{3}$ lin. long, about $\frac{1}{4}$ lin. broad, elliptic or orbicular in outline, nearly as thick as broad, rather dark green. Flowers very rarely.—N. E. Br. in Dyer, Fl. Cap. vii. 40; Rendle in Cat. Afr. Pl. Welw. ii. 92. *W. arrhiza*, Wimm. Fl. Schles. ed. 3, 140; Journ. Bot. 1865, 113, t. 29; Hegelmaier, Monogr. Lemn. 124, and in Engl. Jahrb. xxi. 301; Engl. & Prantl, Pflanzenfam. ii. iii. 164, 154, fig. 101, D-E, 157, fig. 103, 160, fig. 105, A, and 106, E-F; Durand & Schinz, Conspect. Fl. Afr. v. 485; Engl. Pfl. Ost-Afr. C. 422. *Lemna arrhiza*, Linn. Mant. 294. *Bruniera vivipara*, Franch. in Billotia, i. 25, t. 1.

Lower Guinea. Angola: Barra do Dande; plentiful in lakes near the banks of the River Dande, near Bombo, *Welwitsch*, 210! and by the banks of the River Lifune, at Libollo, *Welwitsch!* Icolo e Bengo; Lagoa de Quilunda, near Prata, *Welwitsch*, 211. Huilla; between Huilla and Humpata, *Johnston!*

Mozamb. Dist. German East Africa: Usaramo; Dar es Salaam, *Hildebrandt*, 1236!

Very widely distributed in the Eastern Hemisphere, and has been found in Brazil according to Hegelmaier.

5. **W. cylindracea,** *Hegelmaier, Monogr. Lemn.* 123, *t.* 1, *figs.* 14, 15. Frond minute, about $\frac{1}{3}$ lin. long, $\frac{1}{5}$ lin. broad and thick, ellipsoid, ovoid, or subcylindric, obtuse at both ends, or somewhat pointed at the apex, convex on both sides, but the lower surface more so than the upper, deep green, shining. Flowers unknown.—Hegelmaier in Engl.

Jahrb. xxi. 302; Rendle in Cat. Afr. Pl. Welw. ii. 92. *Telmatophace cylindracea*, Welw. ex Hegelmaier, Monogr. Lemn. 123.

Lower Guinea. Angola: Libongo; in rocky pools on the mountains behind the Banza de Libongo, in the purest, freshest drinking-water, where no other plant grows, *Welwitsch*, 212.

ORDER CLII. **ALISMACEÆ.** (By C. H. Wright.)

Flowers regular, hermaphrodite, monœcious or polygamous, very rarely diœcious. Perianth-segments 6, 2-seriate or very rarely 1-seriate by the absence of the inner whorl, imbricate; outer usually herbaceous, concave, nerved, persistent; inner usually larger, petaloid, deciduous. Stamens 6 or more, rarely 3, hypogynous or inserted on the base of the perianth-segments; filaments terete or flattened; anthers basifixed, or dorsifixed near the base, erect, obtuse, shortly bifid or with prolonged connective, dehiscing by lateral or more or less dorsal longitudinal slits. Carpels 6 to many, rarely 3, arranged in a verticil or spiral, distinct or connate at the base, sessile or shortly stalked, 1-celled; receptacle flat, oblong or globose; style subterminal or ventral, rarely absent; stigma terminal and small or slightly capitate, or ventral (rarely dorsal) and decurrent; ovules solitary or 2 superposed, attached to the inner angle of the carpel, or numerous on reticulate parietal placentas. Fruit-carpels distinct or connate at the base, 1-celled, crustaceous, coriaceous or membranous, usually bearing the remains of the style, indehiscent or dehiscing by the ventral suture, very rarely circumscissile at the base. Seeds small or minute, ovoid, oblong or compressed; testa membranous or coriaceous, smooth, rugose or slightly spiny; albumen none; embryo horseshoe-shaped; radicle thickened.—Aquatic or marsh herbs, erect, rarely floating, usually glabrous, with milky juice, scapigerous or caulescent, perennial, rarely annual. Rhizome short or long. Leaves erect, rarely floating, radical or clustered at the nodes of a creeping stem, petiolate; lamina various, often pellucid-dotted or -striped; nerves converging towards the apex of the lamina. Inflorescence indefinite, of racemose or spicate verticils, more rarely pseudo-umbellate or with solitary flowers; bracts at the base of the verticils or umbels, membranous; bracteoles small. Flowers white or rose, rarely yellow or blue.

Genera about 13, species about 60, in fresh water throughout the globe except in the frigid zones.

TRIBE I. **Alismeæ.**—*Ovule solitary and basal, or 2 (rarely more) attached to the inner angle of the carpel. Carpels indehiscent.*

*Inner perianth-segments petaloid, larger than the outer.

Carpels on a small receptacle.

Flowers hermaphrodite	1. ALISMA.
Flowers polygamous	2. LIMNOPHYTON.

Carpels on a large oblong or globose receptacle.

Flowers monœcious	3. LOPHOTOCARPUS.
Flowers hermaphrodite	4. ECHINODORUS.
Flowers diœcious	5. RAUTANENIA.

****Inner perianth-segment much smaller than the outer, or absent.**	
Flowers diœcious, paniculate; stamens 9; carpels many	**6. BURNATIA.**
Flowers monœcious, subspicate; stamens 3; carpels 3–6	**7. WISNERIA.**

TRIBE II. **Butomeæ.**—*Ovules numerous, on reticulately branched parietal placentas. Carpels dehiscing along the ventral suture.*

Only Tropical African genus	**8. BUTOMOPSIS.**

1. ALISMA, Linn.; Benth. et Hook. f. Gen. Pl. iii. 1004.

Flowers hermaphrodite. Sepals 3, herbaceous, persistent, patent, reflexed or erect after flowering. Petals 3, larger than the sepals, deciduous. Stamens 6, rarely 9, slightly perigynous; filaments subulate; anthers dorsifixed near the base. Carpels few or many, distinct, inserted on a small receptacle; style ventral or subapical, often very short, deciduous or persistent; stigma terminal, small; ovule solitary, basal, raphe ventral. Achenes few or many, laterally compressed or turgid, usually dorsally 3-ribbed; pericarp coriaceous or hardened, indehiscent. Seed basal, erect, compressed; testa membranous; embryo curved.—Perennial, acaulescent, scapigerous, marsh herbs. Leaves erect, long petioled, elliptic, lanceolate or sagittate, sometimes pellucid dotted. Scape short or long. Flowers umbellate or on a panicle with verticillate branches and branchlets, with 3 bracts at the nodes, long pedicellate, white or light rose.

Species about 10, in Europe and Temperate and Tropical Asia, Australia, and America.

Carpels verticillate, laterally compressed	**1. *A. Plantago.***
Carpels irregularly verticillate, scarcely compressed.	
Sepals erect after flowering, sheathing the fruit	**2. *A. parnassifolium.***
Sepals patent after flowering	**3. *A. oligococcum.***

1. **A. Plantago,** *Linn. Sp. Pl. ed.* i. 342. Rhizome tuberous, densely covered with root-fibres. Leaves lanceolate, ovate or cordate, $1\frac{1}{2}$–8 in. by $\frac{1}{2}$–$4\frac{1}{2}$ in., 3–7-nerved. Scapes solitary or many, erect or more or less arcuate, 1–2 ft. high, obscurely trigonous; branches verticillate; flowers about 8 in each verticil; pedicels slender, patent; bracts lanceolate, acute, membranous, 5–6 lin. long. Sepals broadly ovate, scarious at the margins, 8–10-nerved, $1\frac{1}{2}$ lin. by 1 lin. Petals larger than the sepals, broadly obovate, white. Anthers oblong, as long as, or shorter than, the complanate filaments. Carpels 15–20; style filiform, aristate. Achenes more or less trigonous, much compressed, membranous at the sides, dorsally 2-ribbed, $\frac{1}{10}$–$\frac{1}{5}$ in. long; remains of style ventral, aristate. Seed-testa thin, slightly rugose.—A. Rich. Tent. Fl. Abyss. ii. 346; Micheli in DC. Monogr. Phan. iii. 32; Zarb in Cat. Spéc. Bot. Pfund, 36; Hook. f. Fl. Brit. Ind. vi. 559; Engl. Hochgebirgsfl. Trop. Afr. 110; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 93; Durand & Schinz, Conspect. Fl. Afr. v. 486; Gregory,

The Great Rift Valley, 399. *A. arcuatum*, Michalet in Bull. Soc. bot. France, i. (1853) 312. *A. Plantago*, var. *arcuatum*, Durand & Schinz, Conspect. Fl. Afr. v. 486.

Nile Land. Kordofan: El Rahad, *Pfund*, 525 (ex *Zarb*). Eritrea: Adi Ugri, near Godofelassi, 6400 ft., *Schweinfurth*, 140. Abyssinia: Shireh province, *Quartin-Dillon, & Schimper* (ex *A. Richard*), by the side of water, from 5200–8500 ft., *Schimper*, 204 and 1538 (ex *Engler*). British East Africa: Leikipia Plateau, in the Guaso Nairotia, *Gregory!*

Very widely distributed, but absent from South America.

2. **A. parnassifolium,** *Bassi in Linn. Syst. ed.* 3, 230. Rhizome short, oblique; root-fibres long, thick; stolons long, slender. Leaves broadly ovate, cordate, coriaceous, acute or obtuse, $\frac{3}{4}$–$4\frac{1}{2}$ in. by $\frac{1}{2}$–$6\frac{1}{2}$ in., 7–15-nerved, marked with pellucid lines; petiole up to 20 in. long. Scape erect, 20–39 in. high, panicled above; flowers 3 in each verticil; pedicels 9–12 lin. long, erect; gemmæ sometimes present; bracts lanceolate, acuminate, acute, many-nerved, 3 lin. long. Sepals broadly ovate, obtuse or emarginate, many-nerved, 2 lin. by $1\frac{1}{2}$ lin., patent during flowering, afterwards erect and sheathing the fruit. Petals broadly ovate, longer than the sepals, irregularly dentate. Stamens 6–9; filaments complanate; anthers extrorse, nearly basifixed, about half as long as the filaments. Carpels 9–12, obovoid, scarcely laterally compressed, dorsally 3–5-ribbed, the ribs becoming less prominent in fruit; epicarp thin; endocarp almost woody; style aristate. Seed-testa thin, striate.—Kunth, Enum. iii. 150; Reichb. Ic. Fl. Germ. vii. 29, t. 56; Benth. Fl. Austr. vii. 186; Buchen. in Abhandl. naturw. Ver. Bremen, ii. (1871), 482; Micheli in DC. Monogr. Phan. iii. 35, 952; Hook. f. Fl. Brit. Ind. vi. 560; Durand & Schinz, Conspect. Fl. Afr. v. 486.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, ser. iii., 222! Bahr-el-Ghazal, *Schweinfurth*, 1166 (ex *Micheli*).

Also in Europe, India, Queensland and Madagascar.

The style is much shorter in fruit in the tropical African specimen seen, than in those from other localities.

3. **A. oligococcum,** *F. Muell. Fragm.* i. 23. Rhizome short, bearing many stout rootlets. Leaves radical, membranous, broadly ovate-cordate, $2\frac{3}{4}$–$4\frac{3}{4}$ in. long, 2–3 in. wide, obtuse, basal lobes approximate; primary nerves 11–13, prominent beneath, secondary parallel, remainder anastomosing; pellucid dots scattered; petiole 8–30 in. long, transversely septate within; submerged leaves thinly membranous, narrower than the aerial, scarcely cordate. Scape erect, paniculate above, much longer than the leaves, terete, transversely septate within; bracts free, lanceolate, acute, leafy, the lower 1 in. long. Flowers 3 in each verticil; pedicels longer than the bracts, slender, after flowering divaricate-patent. Sepals $1\frac{1}{2}$ lin. long, ovate-oblong, obtuse, after flowering patent. Petals 3 lin. long, ovate-lanceolate, unguiculate, shortly acuminate, white. Stamens 6, 1 lin. long; filaments complanate; anthers ovate, emarginate at either end. Carpels 6, broadly

ovate; style slender, apical, rostrate, deciduous. Achenes ovoid-reniform; endocarp thick, almost woody, with dorsal tuberculate ribs. Seed with thin, nearly smooth, testa.—Benth. Fl. Austr. vii. 185; Micheli in DC. Monogr. Phan. iii. 37; Hook. f. Fl. Brit. Ind. vi. 560; Durand & Schinz, Conspect. Fl. Afr. v. 486. *A. apetalum*, Wall. Cat. 4996. *A. glandulosum*, Thwaites, Enum. Pl. Zeyl. 332.

Upper Guinea. Niger Territory: "Nupe?" *Barter*, 1062!

Also in Northern India, Ceylon and Australia.

2. **LIMNOPHYTON**, Miq.; Benth. et Hook. f. Gen. Pl. iii. 1005.

Flowers polygamous. Sepals 3, herbaceous, persistent, reflexed after flowering. Petals 3, larger than the sepals, deciduous. Stamens 6, perigynous; filaments subulate, compressed; anthers linear-oblong, dorsifixed near the base. Carpels 15–20 on a small rather flat receptacle, distinct, ovoid; style ventral, short, thick, deciduous at least in the upper part; stigma small, capitate; ovule basal, anatropous. Achenes many, distinct, obovoid, turgid, dorsally 3-ribbed; pericarp bony within, hollow on either side. Seed basal, oblong, compressed; testa membranous; embryo curved; radicle thickened at the end.—Erect, robust, perennial, acaulescent, scapigerous herbs. Leaves erect; petiole long, thick; lamina broadly sagittate, pellucid-dotted, with 7–11 obliquely branched nerves. Scape thick. Flowers in verticils arranged in racemes or panicles, 3-bracteate at the nodes, the upper male, the lower hermaphrodite and mixed with a few male; pedicels thick, decurved after flowering.

Species 1, extending into Tropical Asia.

1. **L. obtusifolium**, *Miq. Fl. Ind. Bat.* iii. 243. Rhizome short, densely covered with thick rootlets. Leaves all radical; petiole long, gradually tapering upwards, glabrous or sometimes puberulous, especially in the upper part; blade sagittate, glabrous or puberulous; terminal lobe 2–7 in. long, 2–6 in. broad, triangular, obtuse, rarely acute or acuminate, nerves radiating from the apex of the petiole and somewhat converging above; basal lobes separated by a sinus of 50–140°, 2–7 in. long, 1–3 in. broad across the base, acuminate. Scapes solitary or several; lower branches up to 10 in. long, sometimes puberulous; bracts membranous, up to 1 in. long; flowers 4–15 in each whorl; pedicels up to 1½ in. long, those of the male flowers more slender than those of the hermaphrodite. Sepals ovate, obtuse, 2 lin. long, many-ribbed. Petals white (*Barter*), narrowly ovate from a cuneate base. Stamens of the male flower larger than those of the hermaphrodite; filaments dilated at the base, glandular-pubescent, half as long as the anthers; anthers broadly ovate, subsagittate. Carpels entirely absent in the male flowers, in the hermaphrodite flowers 15–20 in 2–4 whorls, ovoid. Achenes obovoid, dorsally 3-ribbed or almost winged, 3 lin. long, 2 lin. broad; style-base more or less persistent. Seed horseshoe-shaped; testa thin, nearly smooth.—Schweinf. Beitr.

Fl. Aethiop. 295; Micheli in DC. Monogr. Phan. iii. 39; Hook. f. Fl. Brit. Ind. vi. 560; Engl. Pfl. Ost-Afr. C. 94; Rendle in Cat. Afr. Pl. Welw. ii. 93. *Sagittaria obtusifolia*, Linn. Sp. Pl. ed. i. 993; Speke, Nile, Append. 650; Baker in Trans. Linn. Soc. xxix. 157, t. 102. *S. nymphæifolia*, Hochst. ex Buchen. in Flora, 1865, 246. *Alisma sagittifolia*, Willd. Sp. Pl. ii. 277; Benth. in Hook. Niger Fl. 528; Schweinf. Beitr. Fl. Aethiop. 206. *A. Kotschyi*, Hochst. in Flora, 1841, Intellig.-bl. 44, and 1843, 499. *A. obtusifolium*, Thwaites, Enum. Pl. Zeyl. 332. *Dipseudochorion sagittifolium*, Buchen. in Flora, 1865, 245.

Upper Guinea. Senegal, *Roger*, 60! *Perrottet*, 807! Senegambia, *Perrottet!* *Heudelot*, 231! Sierra Leone: in wet places at Likuru and common up to Farana, *Scott-Elliot*, 4972! Niger Territory: Nupe, in swamps, *Barter*, 1532!

Nile Land. Kordofan: Arashkol Mountain; at Omkenem, *Steudner*, 685! *Kotschy*, 169! Birket Rahad, *Pfund*, 407! 798! British East Africa: banks of the Nile, at Abu Kuka, *Petherick!* and at Gondokoro, *Speke & Grant*, 767! White Nile, without precise locality, *Sabatier!* coast, near Lamu Island, *Hildebrandt*, 1319! 1912!

Lower Guinea. Angola: Icolo e Bengo; plentiful at the muddy marshy edges of Lagoa de Funda, near Funda, *Welwitsch*, 3010!

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; in a marsh at Lupata, *Kirk!* at N'Kueza (Ankweza), north of Sena, *Kirk!* British Central Africa: Tanganyika to Moero Plateau, *Carson*, 40! Ngamiland; Botletle Valley, *Lugard*, 206!

3. **LOPHOTOCARPUS**, Durand, Index Gen. Phan. x. and 627.

Flowers hermaphrodite and male, monœcious. Sepals 3, distinct, persistent, sheathing in fruit. Petals 3, deciduous, imbricate. Stamens 9–15, hypogynous; filaments complanate; anthers 2-celled, extrorse, oblong, cells adnate to the connective. Carpels numerous; ovules solitary, basal, erect, anatropous; style apical, long, oblique, persistent. Achenes densely congested on a convex receptacle, much laterally compressed. Seed basal; testa thin, punctate; embryo horseshoe-shaped; radicle thick.—Marsh herbs. Leaves radical, often floating, sagittate, with a network of laticiferous vessels; petiole long. Scape unbranched; flowers 2–3 in each verticil, lower hermaphrodite, upper hermaphrodite and male; bracts membranous.—*Lophiocarpus*, Miq. Ill. Fl. Arch. Ind. 50, not of Turcz. *Sagittaria*, Sect. *Lophiocarpus*, Benth. et Hook. f. Gen. Pl. iii. 1006.

Species 3, one in North America, another in Brazil, and the following in Tropical Asia, Africa and America.

1. **L. guyanensis,** *Durand & Schinz, Conspect. Fl. Afr.* v. 487. Rhizome short, densely covered with rootlets. Leaves widely ovate-cordate, floating, obtuse or slightly emarginate, 2 in. long, 1¼ in. broad, occasionally some submerged leaves with reduced blades are present; petiole varying in length with the depth of the water, transversely septate inside. Scape erect or procumbent, bearing few-flowered whorls

near its apex; bracts widely ovate, obtuse, 6 lin. long; flowers hermaphrodite and male. Sepals broadly ovate, obtuse, flat, erect or sheathing in fruit. Petals cuneate, a little longer than the sepals, fugacious. Stamens 9–12 (6–10 in the male flowers); filaments complanate; anthers elongate, more or less sagittate at the base, shorter than the filaments. Ovary compressed, rudimentary in the male flower; style thick, oblique. Achenes much laterally compressed, with a prominent toothed rib on the back and front. Seed slightly rugose.—*Sagittaria cordifolia*, Roxb. Hort. Beng. 68, and Fl. Ind. iii. 647; Kunth, Enum. iii. 161; Benth. Fl. Hongk. 346; Schweinf. Beitr. Fl. Aethiop. 295. *S. nymphæifolia*, Hochst. in Flora, 1842, Beibl. 133. *S. guayanensis*, H. B. & K. Nov. Gen. et Sp. Pl. i. 250; Hook. f. Fl. Brit. Ind. vi. 561. *Lophiocarpus guyanensis*, Micheli in DC. Monogr. Phan. iii. 62; Buchen. in Engl. Jahrb. ii. 484.

Upper Guinea. Senegambia, *Heudelot!*

Nile Land. Kordofan; in shallow stagnant pools at Tejara, *Kotschy*, 423!

Also in Madagascar, Tropical Asia northwards to Hongkong, and Tropical America from Mexico to Paraguay.

4. ECHINODORUS, L. C. Rich.; Benth. et Hook. f. Gen. Pl. iii. 1006.

Flowers hermaphrodite. Sepals 3, herbaceous, persistent, reflexed or erect after flowering. Petals 3, larger than the sepals, deciduous. Stamens 6 to many, hypogynous; filaments subulate, compressed; anthers oblong or linear-oblong, dorsifixed near the base. Carpels numerous, distinct, imbricate on an oblong receptacle, obovoid, attenuate into a persistent oblique style; stigma minute; ovule basal, erect, anatropous. Achenes many, obovoid or oblanceolate, congested into a head, strongly ribbed and crowned by the rigid aristate style. Seed oblong, compressed; testa membranous; embryo hooked; radicle thickened at the end.—Annual or perennial, acaulescent, scapigerous, often tall herbs. Leaves long petioled; lamina elliptic, cordate, lanceolate or sagittate, usually with pellucid dots or lines. Flowers in many-flowered verticils on narrow straight racemes, 3-bracteate at the nodes or (in the African species) reduced to a single flower; bracteoles many; pedicels very short, rigid.

Species about 14, in Tropical and North Temperate America.

1. **E. humilis,** *Buchen. in Pringsh. Jahrb.* vii. 28. A small herb. Rhizome very short; rootlets filiform. Leaves ovate, membranous, up to 14 by 8 lin., a few oblong-lanceolate and 18 by 3 lin., acute or shortly acuminate, base rounded or slightly decurrent, with 3 nerves radiating from the apex of the petiole and converging towards the apex of the blade; petiole slender, up to 4 in. long, but usually very much shorter. Scapes shorter than the leaves, 1-flowered; flowers erect. Sepals ovate, obtuse, 2–2½ lin. long. Petals longer than the sepals, white. Stamens 6 (or 9, ex *Micheli*), 1½ lin. long; anthers about half

as long as the filaments. Ovary obliquely obovoid, compressed; style rostrate. Achenes many in a subglobose head, obliquely obovoid. much compressed, 1 lin. long, lateral ridges inconspicuous; style aristate. Seed with a thin, almost smooth testa.—Micheli in DC. Monogr. Phan. iii. 55, 952; Durand & Schinz, Conspect. Fl. Afr. v. 488. *Alisma humile*, Kunth, Enum. iii. 154; Benth. in Hook. Niger Fl. 528.

Upper Guinea. Senegal, *Perrottet*, 75! 811! *Roger*, 58! Senegambia: near Richard Toll, *Lelièvre*, *Leprieur*.

Nile Land. White Nile; on the banks of the river, near Gebel Nyemati, *Schweinfurth*, 1032! Aba (Abbah) Island, *Schweinfurth*, 991!

5. **RAUTANENIA**, Buchen. in Bull. Herb. Boiss. v. 854.

Flowers unisexual. Sepals 3, persistent. Petals 3, marcescent. Stamens hypogynous, 7, 8, or 9, sometimes more or less connate in pairs. Carpels 7–9, 1-ovuled. Achenes irregularly capitate. Seed erect; embryo horseshoe-shaped.—An erect, rush-like perennial. Inflorescence paniculate; flowers small, verticillate.

Endemic, monotypic.

1. **R. Schinzii,** *Buchen. in Bull. Herb. Boiss.* v. 855. Rhizome thick; rootlets filiform, white. Leaves 1 ft. long, 2 lin. wide, linear or linear-lanceolate, flat, 3-nerved, acute. Scape about as long as the leaves, erect, terete, striate when dry; panicle with ternate branches; bracts subulate, the lowest 10 lin. long; flowers diœcious, odorous. Sepals broadly ovate, obtuse, 2 lin. long; margins white, membranous. Petals half as long as the sepals, reniform-orbicular, marcescent, thin, white. Stamens 7–9; filaments linear-subulate, white; anthers yellow, oblong, basifixed, dehiscing longitudinally. Carpels obovoid, compressed. Achenes semiorbicular, with three strong ridges running nearly round each carpel; style persistent, subapical, hooked. Seeds erect, much compressed, smooth.—*Echinodorus Schinzii*, Buchen. in Bull. Herb. Boiss. iv. 413, and App. iii. 10.

Lower Guinea. German South-west Africa; Amboland; Omulonga, *Rautanen*, 51, Ombalambuenge, *Rautanen*, 159! Olukonda, *Rautanen*, 222!

6. **BURNATIA**, Micheli; Benth. et Hook. f. Gen. Pl. iii. 1007.

Flowers diœcious, small. Male flowers: Sepals 3, marcescent. Petals 3, much smaller than the sepals. Stamens 9, inserted at the base of the petals; filaments subulate; anthers linear-oblong, as long as the filaments, dorsifixed near the base. Rudimentary carpels about 12, hatchet-shaped. Female flowers: Perianth-segments 3, small, orbicular, membranous, erect after flowering. Stamens 0, or 1–2 imperfect. Carpels about 12, crowded on a small receptacle, obliquely semiorbicular; stigma ventral, sessile, papillose; ovule solitary, basal, anatropous. Achenes 6–8, obovate-orbicular, compressed, dorsally 3-ribbed; stigma

minute, ventral, rostrate; pericarp coriaceous. Seed broadly oblong; testa membranous; embryo curved; radicle thickened at the end.—An erect, acaulescent, scapigerous, marsh herb. Leaves long-petioled; lamina linear, or elliptic-lanceolate, acute; nerves 7–9 with very slender oblique branches. Panicle verticillately branched, 3-bracteate at the nodes, male lax with slenderly pedicelled globose flowers, female contracted with much smaller subsessile flowers.

Endemic, monotypic.

1. **B. enneandra,** *Micheli in DC. Monogr. Phan.* iii. 81. Leaves lanceolate, rarely oblong, acute at both ends, 5–8 in. long, 7–18 lin. broad, membranous, with 7–9 weak nerves; petiole 5–16 in. long, complanate. Scape erect, longer than the leaves; male panicle 12–16 in. long, female 8–10 in. long; bracts membranous, lanceolate, up to 1 in. long; bracteoles small; pedicels up to 5 lin. long. Sepals 3, broadly ovate, obtuse, of the male erect, of the female patent but erect after flowering, $1\frac{1}{2}$–2 lin. long. Petals small, present in the male flowers only. Achenes discoid, dorsally 3-ribbed. Seed slightly rugose.—Engl. Pfl. Ost-Afr. C. 94; Durand & Schinz, Conspect. Fl. Afr. v. 488. *Alisma enneandra*, Hochst. in Flora, 1842, Beibl. 133. *Echinodorus? enneander*, A. Br. in Schweinf. Beitr. Fl. Aethiop. 295, 309.

Nile Land. Kordofan: at the edges of the stagnant pools near Arashkol Mountain, *Kotschy*, 192! British East Africa: Jur; near Jur Ghattas, *Schweinfurth*, 2128! 2287!

Mozamb. Dist. British Central Africa: Matabeleland; Libanani Forests and Flats, *Holub!*

7. WISNERIA, M. Micheli; Benth. et Hook. f. Gen. Pl. iii. 1007.

Flowers monœcious, minute. Perianth-segments membranous, 3 persistent, or 5–6 in 2 series, the 3 outer equal or 2 smaller, concave and persistent, 2 or 3 inner much smaller and deciduous. Male flower: Stamens 3; filaments subulate; anthers basifixed, 2-celled, dehiscing longitudinally. Rudiment of ovary subulate. Female flower: Staminodia setaceous. Carpels 3–6, ovoid; style none or terminal and subulate; stigma minute; ovule solitary, basal, anatropous. Achenes subglobose, broadly oblong or ellipsoid, compressed or turgid, obscurely costate, obtuse or beaked by the persistent style; pericarp thin or rather thick. Seed oblong or subglobose; testa membranous; embryo horseshoe-shaped; radicle thickened.—Acaulescent, scapigerous, marsh or water herbs. Rhizome short, bearing thick root-fibres. Leaves long-petioled, with the lamina more or less expanded; midrib evident. Scape erect, unbranched; bracts united into truncate membranous campanulate sheaths surrounding the scape; male flowers in the upper part of the scape, pedicellate, several subtended by 2–3 membranous lacerate bracteoles; female flowers in the lower part of the scape, ebracteolate.

Species 3, one in Malabar, another in Madagascar, and the following in Tropical Africa.

1. **W. Schweinfurthii,** *Hook. f. in Benth. et Hook. f. Gen. Pl.* iii. 1007. Petiole sheathing at the base, 9 in. long, robust; lamina oblong or oblanceolate, obtuse, up to 6 in. by 6 lin.; lateral nerves 1 on either side. Scape about as long as the leaves; whorls of bracts at length 6–9 lin. apart. Perianth-segments 3. Achenes compressed, 3-ribbed, 1½ lin. long, beak 1 lin. long.

Nile Land. British East Africa: Bongo; Gir, *Schweinfurth*, 2157! Jur; Jur Ghattas, *Schweinfurth*, 2304!

8. **BUTOMOPSIS,** Kunth; Benth. et Hook. f. Gen. Pl. iii. 1008.

Flowers hermaphrodite. Sepals 3, persistent, erect after flowering, imbricate. Petals 3, smaller than the sepals, fugacious. Stamens 9 (rarely fewer), in two whorls; filaments flattened; anthers 2-celled, basifixed, extrorse. Carpels 6 or fewer, verticillate, slightly connate on the ventral side near the base; styles short; stigmas lateral; ovules numerous. Follicles usually 6, tapering above into the persistent style, dehiscing along the ventral suture. Seeds numerous, curved; testa nearly smooth; embryo horseshoe-shaped.—A scapigerous marsh herb, with milky juice. Leaves radical, erect, petiolate. Flowers in umbellate cymes; pedicel elongated in fruit; bracts membranous.

Species 1, extending into Tropical India and Australia.

1. **B. lanceolata,** *Kunth, Enum.* iii. 165. Rhizome short, bearing numerous slender rootlets. Leaves narrowly ovate, acute, tapering below into the petiole, membranous, entire, glabrous, with 2–6 secondary nerves pinnately arranged and converging towards the apex, up to 4 in. by 1½ in.; petiole smooth, up to 10 in. long. Scape usually about 6-flowered, overtopping the leaves; peduncle terete, glabrous, up to 1 ft. long; bracts broadly ovate, acuminate, up to 9 lin. long; pedicels up to 4 in. long in fruit, usually straight. Sepals broadly ovate, acute or subobtuse, persistent and sheathing the base of the fruit. Petals ⅔ as long as the sepals, obovate, obtuse, fugacious, white. Stamens 9 or fewer; filaments dilated below; anthers shorter than the filaments, oblong. Ovaries ovoid. Follicles ovoid-oblong, acute, connate below, obscurely keeled on the dorsal side. Seeds scarcely ½ lin. long; testa crustaceous —Schweinf. Beitr. Fl. Aethiop. 206; Benth. Fl. Austr. vii. 187; Micheli in DC. Monogr. Phan. iii. 87; Hook. f. Fl. Brit. Ind. vi. 562. *Butomus senegalensis*, Perrottet ex A. Br. in Flora, 1843, 499. *Tenagocharis cordofana*, Hochst. in Flora, 1841, 369. *T. alismoides*, Hochst. in Flora, 1842, Beibl. 134; A. Br. in Flora, 1843, 499. *T. lanceolata*, Durand & Schinz, Conspect. Fl. Afr. v. 489.

Upper Guinea. Senegal, *Roger*, 65! Senegambia, *Heudelot*, 126! Niger Territory: Nupe; in swamps, *Barter*, 1509!

Nile Land. Kordofan: in stagnant pools near Arashkol mountain, *Kotschy*, 193! in the White Nile at Omkenen, near Arashkol mountain, *Steudner*, 687!

Also in Northern India and Queensland.

ORDER CLIII. **NAIADACEÆ.** (By Arthur Bennett.)

Flowers usually green (often coloured in *Aponogeton*), 1–2-sexual. Perianth 0, or tubular, or of 3–4 inferior valvate segments. Stamens hypogynous; anthers 1–2-celled. Ovary of 1–4 1-ovuled carpels; style long or short; stigma of many forms. Fruit of 1-seeded utricules, achenes, or drupelets. Seeds exalbuminous; embryo curved or straight, large at the radicular end.—Aquatic or marsh herbs, of various habit. Rootstock usually creeping. Stems simple or branched. Leaves erect, submerged, or floating, sheathing at the base; stipules 0, or contained in the sheath.

Genera 16, species about 120, found in all climates.

*Stigmas discoid or decurrent on the ovary.
- Perianth present; flowers bisexual.
  - Marsh herbs; sepals 6, green . . . 1. TRIGLOCHIN.
  - Aquatics.
    - Sepals 1–3, white or coloured . . . 2. APONOGETON.
    - Sepals 4, herbaceous . . . . . 3. POTAMOGETON.
- Perianth none; flowers uni- or bi-sexual.
  - Stamens 2; carpels stipitate . . . 4. RUPPIA.
  - Stamen 1; carpels usually sessile . . 5. ZANNICHELLIA.

**Stigmas subulate or capillary.
- Flowers sessile on a flat linear spadix . . . 6. ZOSTERA.
- Flowers axillary . . . . . 7. NAIAS.
- Flowers enclosed in membranous sheaths . . 8. CYMODOCEA.

1. **TRIGLOCHIN,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 1012.

Perianth-segments 3 or 6, herbaceous, deciduous. Stamens 6, at the base of the perianth-segments; anthers with 2 rounded lobes. Carpels 3–6, 1-celled, 1-ovuled, 3 often imperfect; styles short, sometimes connate; stigmas sessile or subsessile, plumose. Fruit of 3 or 6 free or connate achenes or follicles; tips recurved. Seed erect; embryo straight.—Marsh herbs with rush-like flat or terete leaves. Flowers small, bisexual, spicate or racemose, 2-bracteate.

Species about 12, chiefly in the temperate regions of both hemispheres.

- Fruit linear . . . . . 1. *T. bulbosum.*
- Fruit subrotund . . . . . 2. *T. striatum.*

1. **T. bulbosum,** *Linn. Mant. Alt.* 226. Stem simple, tuberous at the base, with interlaced fibres forming a brown mass at the base. Leaves half-cylindrical, finely striate, channelled, generally shorter than the stem. Raceme elongating after flowering, 6–12-flowered. Fruits erect, ascending (not adpressed), larger at the base than the apex, of 3 carpels.—Bot. Mag. t. 1445; Micheli in DC. Monogr. Phan. iii. 99; Buchen. in Engl. Jahrb. ii. 510; Durand & Schinz, Conspect. Fl. Afr. v.

490; A. Bennett in Dyer, Fl. Cap. vii. 42; Rendle in Cat. Afr. Pl. Welw. ii. 93. *T. Barrelieri*, Loisl. Fl. Gall. ed. 2, i. 264.

Lower Guinea. Angola: Huilla; plentiful in boggy pastures and on the banks of the river at Lopollo and near Ohai, *Welwitsch*, 3017!

Also in North and South Africa.

2. **T. striatum,** *Ruiz & Pav. Fl. Peruv.* iii. 72. Rootstock small, stoloniferous. Leaves variable, narrowly linear to subulate, striate, generally stouter than the scape. Scape leafless, 3–12 in. tall; flowers many, shortly pedicelled. Carpels 3, orbicular, with 6 permanent ribs, about 1–1½ lin. long.—Micheli in DC. Monogr. Phan. iii. 101; Buchen. in Engl. Jahrb. ii. 510; Durand & Schinz, Conspect. Fl. Afr. v. 491; A. Bennett in Dyer, Fl. Cap. vii. 42; Rendle in Cat. Afr. Pl. Welw. ii. 93.

Lower Guinea. Angola: Mossamedes; in brackish swamps near Aguadas, between Mossamedes and Calvaheiros, not far from the sea, rather rare, *Welwitsch*, 3016!

Also in South Africa.

2. APONOGETON, Thunb.; Benth. et Hook. f. Gen. Pl. iii. 1013.

Perianth of 1–3 equal or unequal segments, or 0. Stamens 3–6 or more; filaments subulate, persistent. Carpels 3–6, 2- or more ovuled; stigma on a stout style, decurrent or persistent. Fruit of 3 or more hardened follicles. Seeds erect; embryo straight.—Submerged plants with tuberous rootstocks, in the early state very like *Potamogeton*. Leaves either floating or erect; varying in shape from linear to oblong (or subulate in one species?). Scape with simple or bifid sessile spikes of unilateral or distichous flowers, the young flower enclosed in a deciduous sheath.

Species about 20, in Asia, Africa and Temperate Australia.

Leaves not or only slightly dilated into a blade . . 1. *A. spathaceus.*
Leaves petiolate, oblong.
  Leaf-blades distinctly cordate at the base.
    Leaf-blades more than three times as long as broad, very obtuse . . . . . 2. *A. subconjugatus.*
    Leaf-blades less than three times as long as broad, subacute . . . . . 3. *A. Holubii.*
  Leaf-blades not distinctly cordate at the base.
    Flower-spikes slender, not exceeding 2½ lin. in diam., whitish . . . . . 4. *A. kraussianum.*
    Flower-spikes 3 lin. or more in diam.
      Perianth-segments about 1 lin. long, whitish . 5. *A. Rehmanni.*
      Perianth-segments 1¾–2 lin. long, purple . . 6. *A. abyssinicus.*
Leaves petiolate, linear or linear-lanceolate.
  Leaves 7-nerved . . . . . 7. *A. Stuhlmanii.*
  Leaves 5-nerved . . . . . 8. *A. Boehmii.*
Leaves sessile, ligulate, membranous . . . . 9. *A. vallisnerioides.*

1. **A. spathaceus,** *E. Meyer in Drège, Zwei Pflanzengeogr. Documente*, 137, *name only*. Leaves very narrow or elongate-subulate, obtuse or dilated into a linear-lanceolate blade. Spike bifid; branches

stout, dense-flowered; floral bracts 2, obovate-oblong, obtuse, 3-nerved, pale lilac. Stamens 6–8. Follicles 3–8.—Hook. f. in Bot. Mag. sub t. 6399; Engl. Jahrb. viii. 272; Durand & Schinz, Conspect. Fl. Afr. v. 493; A. Bennett in Dyer, Fl. Cap. vii. 44; Rendle in Cat. Afr. Pl. Welw. ii. 94.

Lower Guinea. Angola: Pungo Andongo; in marshy places and boggy meadows between Condo and Quisonde, between Pungo Andongo and Quisonde, and between Quibinde and Quitage, plentiful, *Welwitsch*, 3012!

Also in South Africa.

2. **A. subconjugatus,** *Schumacher & Thonning, Beskr. Guin. Pl.* 183. Bulb subrotund and truncate. Leaves long petioled; petioles semiterete below, terete above; blade 5–12 in. long, 1½–1¾ in. broad, elongate-oblong, obtuse, cordate at the base, often speckled with brown below. Spikes bifid, 1–1½ in. long. Bracts 2, subovate, obtuse, yellowish. Stamens 6, unequal. Carpels 3–5, usually 4, ovoid, compressed, tapering into a short style; ovules 10–12. Seeds 5–8, oblong, angular.—*A. Heudelotii*, Engl. in Engl. Jahrb. viii. 271; Durand & Schinz, Conspect. Fl. Afr. v. 492. *Ouvirandra Heudelotii*, Kunth, Enum. iii. 593; Benth. in Hook. Niger Fl. 528.

Upper Guinea. Senegambia, *Heudelot*, 433! *Perrottet*, 1009. Guinea, *Thonning!*

3. **A. Holubii,** *Oliver in Hook. Ic. Pl. t.* 1470. Leaves oblong-elliptic, 4½–6 by 2–3 in., apex shortly semi-obtuse, base rounded, cordate, 7–9-veined, veining obscure; petioles elongated. Peduncle thick, tapering upwards; spike bifid, 2½–3½ in. long, dense-flowered; flowers hermaphrodite; bracts 2, oblong or ovate-oblong, obtuse. Stamens about 6. Follicles oblong, terete, with a beak ¾ as long as the ovary.—Durand & Schinz, Conspect. Fl. Afr. v. 492; A. Bennett in Dyer, Fl. Cap. vii. 44.

Mozamb. Dist. Bechuanaland: Eastern Bamanguata Territory, at Henrys Pan, *Holub*, 1036–1039!

Also in South Africa.

4. **A. kraussianum,** *Hochst. ex Krauss in Flora*, 1845, 343. Leaves long-petioled, floating, oblong, 7–9-nerved, acute, base subcordate; median nerve 3-cleft. Peduncles long, tapering upwards; spike bifid; branches ¾–1½ in. long, not more than 2½ lin. in diam., dense-flowered; flowers whitish. Stamens generally 6; anthers yellowish. Ovaries 3–5 (rarely 6). Follicles globose, with a thickened short beak.—Krauss, Beitr. Fl. Cap. und Natal. 172; A. Bennett in Dyer, Fl. Cap. vii. 44. *A. leptostachyos*, E. Meyer in Drège, Zwei Pflanzengeogr. Documente, 165; Baker in Trans. Linn. Soc. xxix. 158; Engl. Jahrb. viii. 270. *A. abyssinica*, Rendle in Cat. Afr. Pl. Welw. ii. 93, not of Hochst.

Nile Land. British East Africa: Ukamba; Kitui, *Hildebrandt*, 2645!

Lower Guinea. Angola: Pungo Andongo; in ponds near the River Cuanza, near Sansamanda and elsewhere, *Welwitsch*, 3011!

Also in South Africa.

5. **A. Rehmanni,** *Oliver in Hook. Ic. Pl. t.* 1471, *fig. B.* Leaves oblong-subacute, 1–1⅔ in. long, 3–5 lin. broad, subapiculate. Spike bifid, ⅔ in. long, about 3 lin. in diam., dense-flowered, whitish; flowers diœcious; bracts ovate-oblong, subacute. Follicles 8–9, oblong.—Durand & Schinz, Conspect. Fl. Afr. v. 493; A. Bennett in Dyer, Fl. Cap. vii. 44.

Lower Guinea. German South-west Africa: Amboland, ex *Durand & Schinz.*

Also in South Africa.

6. **A. abyssinicus,** *Hochst. in Schimp. Pl. Abyss. Exsicc.* 1483. Stem-base tuberous, globose. Leaves lanceolate, long-petioled; floating leaves lanceolate-ovate. Spike bifid, dense-flowered; branches 1–1½ in. long; peduncle nearly equal in diameter throughout; flowers rose or purplish. Sepals 1¾–2 lin. long, oval-oblong. Stamens 6. Follicles 3, with a beak ⅔ the length of the ovary.—A. Rich. Tent. Fl. Abyss. ii. 351; Durand & Schinz, Conspect. Fl. Afr. v. 491; Engl. Jahrb. viii. 270. *Ouvirandra Hildebrandtii,* Hort. Berol. ex Kuntze in Verhandl. Bot. Ver. Brandenb. xix. ix.; Eichler in Sitz. Ges. Naturf. Fr. Berlin, 1879, 6–12, t. 1.

Nile Land. Eritrea: Kohaito Plateau, 8500–8800 ft., *Schweinfurth,* 137! Abyssinia: in marshes near Axum, *Schimper,* 1483! East Tropical Africa, *London!*

7. **A. Stuhlmannii,** *Engl. in. Notizbl. Königl. Bot. Gart. Berlin,* i. 26. Submerged. Leaves linear, 7-veined, obtuse; petioles longer than the blade. Spike simple, lax-flowered. Sepals 2, obtuse, 1-nerved. Stamens 6, equal in length to the sepals. Carpels 3; ovaries ovoid; style subulate. Follicles 4-seeded.—Pfl. Ost-Afr. C. 94.

Mozamb. Dist. German East Africa: Usinja; Bugando, *Stuhlmann,* 3541.

8. **A. Boehmii,** *Engl. in Notizbl. Königl. Bot. Gart. Berlin,* i. 26. Rootstock tuberous. Leaves submerged, linear-lanceolate, obtuse, 5-nerved; petiole longer than the blade. Spike bifid, dense-flowered. Sepals 3, obovate-spathulate, purple-punctate. Stamens 6. Carpels 3-ovuled.—Pfl. Ost-Afr. C. 94.

Mozamb. Dist. German East Africa: Umyamwezi; in the River Wala, *Boehm,* 98.

9. **A. vallisnerioides,** *Baker in Trans. Linn. Soc.* xxix. 158. Densely cæspitose. Leaves sessile, ligulate, membranous, obtuse, 3–4 in. long. Spike simple, dense-flowered, 1 in. long, 3 lin. thick. Ovaries 4 (?), those of the upper third infertile (?).

Upper Guinea. River Niger, *Baikie!*

Nile Land. British East Africa: Jur; near Kurshook Ali's Seriba, *Schweinfurth,* 1704! 1761! Jur Ghattas, *Schweinfurth,* 4266! Bongo; Gir, *Schweinfurth,* 2152! Dumuku, *Schweinfurth,* 2168! Ukidi (Unyoro), *Speke & Grant!*

"This has a spike like *A. monostachyum,* Roxb., of India, with leaves in shape and texture just like those of a small specimen of *Vallisneria,*" Baker, l.c.

3. **POTAMOGETON,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 1014.

Perianth-segments 4, green, valvate. Anthers 4, sessile, with two roundish cells. Carpels 4 (some abortive), sessile, 1-celled, 1-ovuled; ovules campylotropous; stigma persistent, subsessile or decurrent, altering much in position in ripening. Drupelets small, variable in shape, coriaceous. Seeds subreniform; radicle large.—Submerged water-plants with creeping rootstocks. Stems terete or compressed. Leaves often floating (rarely aërial), alternate or opposite, entire or toothed; stipules intrafoliaceous, free or adnate to the petiole. Flowers small; spicate; bases of the peduncles enclosed in a membranous spathe, ebracteate.

Species 65–75, cosmopolitan.

*Floating leaves present, coriaceous.	
Fruit 3-keeled; stems moderately stout; submerged leaves few or none.	
Leaves tapering to the base	1. *P. fluitans.*
Leaves obtuse at the base	2. *P. Richardi.*
Fruit sharply 3-keeled; stems moderately stout; submerged leaves abundant	3. *P. Schweinfurthii.*
Fruit 3-keeled; stems filiform; submerged leaves abundant	4. *P. javanicus.*
**Floating leaves none.	
Leaves 2–12 lin. broad.	
Leaves crisped, serrulate; fruit long-beaked	5. *P. crispum.*
Leaves flat, entire.	
Fruit large, obliquely obtuse	6. *P. lucens.*
Fruit small, pointed	7. *P. coloratum.*
Leaves less than 2 lin. broad.	
Stipules free.	
Leaves straight, 1–3-nerved; nerves equal	8. *P. pusillum.*
Leaves curved, 1–3-nerved; central nerve very broad	9. *P. Preussii.*
Stipules adnate to the leaf-bases.	
Style on the ventral margin	10. *P. pectinatum.*
Style central.	
Leaves all setaceous or linear-setaceous	11. *P. filiforme.*
Lower leaves $\frac{1}{8}$–$\frac{3}{16}$ in. wide, very rigid, upper linear to filiform	12. *P. Livingstonei.*

1. **P. fluitans,** *Roth, Tent. Fl. Germ.* i. 72. Stem stout. Submerged leaves translucent, linear-lanceolate; floating leaves ovate or ovate-lanceolate, long-stalked, tapering at either end, not plicate; stipules large, blunt. Peduncles stout; spike dense-flowered; no ripe fruit seen on African or European specimens.—A. Bennett in Dyer, Fl. Cap. vii. 46; Rendle in Cat. Afr. Pl. Welw. ii. 94. *P. natans,* var. *fluitans,* Cham. Adnot. Fl. Berol. 4.

Lower Guinea. Angola: Huilla, *Welwitsch,* 249!

Also in North and South Africa, Madagascar, Europe and Asia.

2. **P. Richardi,** *Solms-Laub. in Schweinf. Beitr. Fl. Aethiop.* 194, *and* 292. Stem stout. Submerged leaves few, finer in texture

than in *P. fluitans*, floating leaves ovate or oblong-lanceolate, not plicate at the base; stipules blunt, large. Peduncles stout, slightly swollen upwards; spikes dense-flowered. Fruit large, $2\frac{1}{2}$ lin. long; style long, at first bent back, when ripe nearly central; dorsal ridges 3, the two lateral with blunt wavy tooth-like margins, slightly convex on the ventral margin, and with indications of small bosses, but none of the specimens seen are quite ripe.—Durand & Schinz, Conspect. Fl. Afr. v. 496; A. Bennett in Dyer, Fl. Cap. vii. 47. *P. natans*, A. Rich. Tent. Fl. Abyss. ii. 354, not of Linn. *P. americanus*, var. *Richardi*, Solms-Laub. ex Schweinf. in Bull. Herb. Boiss. ii. App. ii. 8.

Nile Land. Eritrea: Gorge of Degerra, near Saganeita, 7200 ft., *Schweinfurth & Riva*, 891! Abyssinia: in ponds and streams near Adowa, *Schimper*, 135! 958! Amba Sea, *Schimper*, 571! Shireh Province, *Dillon & Petit!* Mai Gouagoua, *Quartin-Dillon!*

Also in South Africa.

The plant mentioned as *P. natans*, Linn., in Schweinfurth's Beitr. Fl. Aethiop. 292, is probably *P. Richardi*, Solms-Laub.

3. **P. Schweinfurthii,** *Arth. Bennett.* Stems about 2 ft. long, branched. Lower leaves crowded, linear-lanceolate, acute, 3–4 by $\frac{3}{8}$ in., tapering into the petiole, 5-nerved, the central nerve broad, consisting of many fine veins with flexuous cross ones; middle leaves lanceolate, 11-nerved, $2\frac{1}{2}$–3 by $\frac{5}{8}$ in., similar in structure to the lower ones; upper leaves floating, coriaceous, lanceolate to lanceolate-ovate, 10–13-nerved, with occasionally additional interrupted nerves, 2–$2\frac{3}{4}$ by $\frac{5}{8}$–$\frac{3}{4}$ in.; petioles 2–$3\frac{1}{2}$ in. long; stipules 1–2 in. long, acute, many-nerved, not winged. Peduncles stout, slightly thickened in the middle, 4–6 in. long, springing from the axils of either submerged or floating leaves; spike $1\frac{1}{4}$–$1\frac{3}{4}$ in. long, dense-flowered, moderately stout. Fruit large, $\frac{1}{8}$–$\frac{3}{32}$ in. long, the ventral margin nearly straight, the dorsal subrotund, sharply 3-keeled, with undulated margins, and slightly (irregularly) warted, with a tooth at the base of the outer margins.

Nile Land. Abyssinia: Begemeder; in Lake Tana, *Schimper*, 1359! British East Africa: at the mouth of the Bahr el Arab, *Schweinfurth*, 1223! in the Bahr el Ghazal, near the Nuer Villages, *Schweinfurth*, 1165!

A most distinct species, with the submerged leaves like those of *P. lucens* (but half the width), the floating leaves nearest to *P. heterophyllus*, and the fruit much as in *P. Richardi*, Solms-Laub. The lower leaves most resembling those of this species occur in some of Rugel's Floridan species of *P. americanus*, Cham. (*P. lonchites*, Tuck.), but even these are not nearly as rigid as in the present plant. It differs from *P. lucens*, Linn., by producing coriaceous floating leaves, from *P. heterophyllus*, Schreb. by the rigid lower leaves, and very different fruit; and from *P. americanus*, Cham., by the floating leaves, much smaller rigid lower leaves, and fruit.

4. **P. javanicus,** *Hassk. in Verh. Nat. Ver. Nederl. Ind.* i. 26. Stem branched, filiform. Submerged leaves, sessile, narrowly linear, acute; floating leaves lanceolate, long-petioled; lower stipules slightly connate, the upper free, acuminate. Peduncles slender; spikes varying from 3–8 lin. long. Fruit compressed, oblique-obovate; style straight

with the ventral margin; dorsal margin 3-keeled, and strongly repand-denticulate, ventral nearly straight, with a projection in the centre, tapering to either end, variable as to the teeth-like projections on various parts of the fruit, which are strongest on the Australian forms. —*P. tenuicaulis*, F. Muell. Fragm. i. 90, 244. *P. parvifolia*, Buchen. in Abhandl. Naturw. Ver. Bremen, vii. 32. *P. huillensis*, Welw. ex Schinz in Ber. Schweiz. Bot. Gesell. i. (1891) 61; Durand & Schinz, Conspect. Fl. Afr. v. 495; Rendle in Cat. Afr. Pl. Welw. ii. 94.

Upper Guinea. Niger Territory: Nupe; in a deep lake near Jeba, *Barter*, 1069!

Nile Land. British East Africa: at the mouth of the Bahr el Arab, *Schweinfurth*, 1225! Niamniam; in the River Rei (Rye), near Gumango Hill, *Schweinfurth*, 2909!

Lower Guinea. Angola: Huilla; in streams near Catumba, *Welwitsch*, 248! River Cunene, *Schinz*, 1001!

Mozamb. Dist. British Central Africa: North-west Kalahari, *Schinz!* (in *Herb. Buchenau*).

Also in South Africa, Madagascar, Australia, the Malay Archipelago and Tropical Asia.

5. **P. crispum,** *Linn. Sp. Pl. ed.* i. 126. Stem compressed, slender, branched. Leaves all similar, sessile, semiamplexicaul, strap-shaped oblong or oblong, variously undulate, strongly serrate at the apex, less so on the margins; stipules small, subobtuse, lower soon decaying. Peduncles between the forks of the stem, rather stout, tapering towards the apex; spike large, lax-flowered. Fruit large, acuminate, compressed, obliquely-ovoid; beak very long and curved. —Durand & Schinz, Conspect. Fl. Afr. v. 493.

Nile Land. Abyssinia: Nubia, *Kotschy*, 20! Bahr el Tussuf, *Steudner*, 212! Kordofan, *Kotschy*, 366! *Cienkowsky!* Senaar, ex *Durand & Schinz.*

Mozamb. Dist. British Central Africa: Nyasaland; in Roangwa (Loangwa River?), Lake Nyasa, *Kirk!*

Widely distributed in all warm and temperate regions.

6. **P. lucens,** *Linn. Sp. Pl. ed.* i. 126. Stem stout, branched. Leaves all submerged; lower ones lanceolate or lanceolate-linear, acuminate, with petioles gradually lengthening to 1–1½ in., the lowest sessile; upper leaves lanceolate to ovate, acute, slightly firmer in texture than the lower; stipules long, beaked or winged. Peduncles 2–9 in. long; stout, tapering upwards; spikes 1½–2 in. long, dense-flowered. Fruits large, slightly acuminate, slightly convex on the ventral margin, nearly semicircular on the dorsal, slightly keeled.

Nile Land. Eritrea: Asmara, 7500 ft., *Schweinfurth & Riva*, 2110! British East Africa; in the Nile, *Speke & Grant!*

Also in Europe, Asia and America.

Var. *fluitans*, Coss. et Germ. Fl. Env. Paris, ed. i. 571. Leaves much longer than in the normal form, up to 10 in. long, usually narrower, much darker in colour, drying blackish-green, with longer petioles, ascending, not semi-patent as in the normal form.—*P. longifolium*, Gay in Poir. Encycl. Suppl. iv. 535. *P. macrophyllus*, Wolfg. in Roem. & Schultes, Mant. iii. 358.

Upper Guinea. Senegal: in Lake Guier, *Rogers! Lepieur!*

Mozamb. Dist. British Central Africa: Lukoma (Likoma Island?) in Lake Nyasa, *Bellingham!* in the south-western bay of Lake Nyasa, *Kirk!*

Also in South Africa, Europe, North America and Australia.

7. **P. coloratum,** *Hornem. Fl. Dan. t.* 1449. Stem slender, branched. Leaves all transparent and net-veined; the upper sometimes nearly sessile, very variable, elliptic to almost orbicular, never plicate at the base, and never (?) floating; lower lanceolate; stipules stout and obtuse. Peduncles slender, nearly equal in diameter throughout; spikes long, cylindrical. Fruit small, greenish, rounded and keeled on the dorsal margin when dry, but not when fresh, with no apparent beak.—*P. plantagineus*, Du Croz in Roem. & Schultes, Syst. Veg. iii. 504; Engl. Pfl. Ost-Afr. A. 80. *P. helodes*, Dum. Fl. Belg. Prod. 163.

Mozamb. Dist. German East Africa: Usambara, ex *Engler.*

Also in Europe, Australia and the West Indies.

8. **P. pusillum,** *Linn. Sp. Pl. ed.* i. 127. Stem slender, subterete, branched. Leaves all similar, sessile, semiamplexicaul, narrowly linear, acuminate, acute or subacute, 1–3-nerved, mostly without fascicles of leaves in the axils; stipules small, acute, or subacute. Peduncles slender, variable in length; spike few-flowered, $\frac{1}{4}$–$\frac{1}{2}$ in. long, not (or very nearly) interrupted. Fruit small, semioval or obovoid, very slightly compressed, bluntly 3-keeled on the dorsal face, slightly convex on the ventral, generally without teeth.—Hook. Niger Fl. 181, 528; Durand & Schinz, Conspect. Fl. Afr. v. 496.

Upper Guinea. Cape Verd Islands; St. Jacob's Island, *Darwin!* Guinea, ex *Durand & Schinz.*

Nile Land. Abyssinia: Shireh; near Arbatienseca, *Quartin-Dillon;* and near Adowa, *Schimper* (ex *Richard*).

Lower Guinea. Angola, ex *Hooker.*

Mozamb. Dist. British Central Africa: Nyasaland; in a pond in the Residency gardens at Zomba, *Whyte!*

Widely distributed in all warm and temperate regions.

9. **P. Preussii,** *Arth. Bennett.* Stems branched, semiterete, striate. Leaves all similar, linear for $\frac{2}{3}$ of their length, then tapering, acute and acuminate, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{1}{16}$–$\frac{3}{32}$ in. broad, generally curved from the base to the apex towards the stem, stiffer in texture than most of the *gramineum* series, 3-nerved; central nerve of 5–9 closely packed veins with anastomosing cross veins; stipules persistent, $\frac{1}{2}$ the length of the internodes, acute, with many fine veins. Peduncles 1–2 in. long, slender, slightly tapering upwards; spike $\frac{1}{4}$–$\frac{3}{8}$ in. long, dense-flowered. Perianth-segments rhombic-orbicular. Fruit small, slightly compressed, with a central beak, keels almost obsolete.

Upper Guinea. Cameroons, *Preuss*, 451! *Staudt*, 462!

Nile Land. Eritrea: in the Gorge of Degerra, near Saganeita, 7200 ft., *Schweinfurth & Riva*, 896! Abyssinia: near Adowa, *Schimper*, 179! Amba Sea, *Schimper*, 570! Shireh Province, *Quartin-Dillon & Petit*, 571!

Schweinfurth refers his 896 to *P. pusillum*, and also 769 (collected at Acrur in Eritrea), which I have not seen. This plant has been named *P. javanicus*, Hassk., but its affinities are with *P. Hillii*, Morong, and *P. acutifolius*, Link, on the one side, and *P. foliosus*, var. *californicus*, Morong, on the other; more remotely (in foliage only) with *P. javanicus*, Hassk. A specimen in herb. Boissier. (Yemen, Arabia, Deflers) may be referred here, but the material is poor.

10. **P. pectinatum,** *Linn. Sp. Pl. ed.* i. 127. Stem cylindrical or subcompressed, repeatedly branched. Leaves all similar, or the upper sometimes setaceous and 1-nerved, the lower linear and 1–3-nerved; stipules long, adnate to the sheathing petiole, free at the apex. Peduncles short or long, equal in diameter throughout; spike often interrupted; upper flowers generally approximate. Fruit large, olive or green, obliquely obovate, slightly compressed, slightly convex on the ventral margin, 3-keeled on the dorsal.—Peters, Reise Mossamb. Bot. 511; Durand & Schinz, Conspect. Fl. Afr. v. 495. *P. marinum*, Linn.? ex Krauss in Flora, 1845, 344.

Upper Guinea. Gold Coast: Cape Coast Castle, *Don!*

Nile Land. Abyssinia: Tigre; Mai Gouagoua, *Quartin-Dillon!*

Lower Guinea. Angola: Mossamedes; in deep ponds near Aguadas, *Welwitsch*, 250! German South-west Africa, ex *Durand & Schinz.*

Mozamb. Dist. Portuguese East Africa: Lower Zambesi, in the large lake of Shupanga, *Peters!*

Also in North and South Africa, Socotra and the Mascarene Islands.

11. **P. filiforme,** *Pers. Syn.* i. 152. Stem filiform, branched. Leaves all similar, setaceous (or linear-setaceous), 1-nerved, usually much stouter than the peduncles; stipules slender, adnate to the sheathing petiole, free at the apex. Peduncles slender, long, equal in diameter throughout; spike much interrupted, but in a much more regular manner than in *P. pectinatum*, as the fruits are usually in whorls. Fruit much smaller than in *P. pectinatum*, with the beak central and the margins rounded.

East Tropical Africa. Ruwenzori Expedition: without precise locality, *Scott-Elliot!*

Widely distributed in all warm and temperate regions.

12. **P. Livingstonei,** *Arth. Bennett.* Stem from a slightly creeping rhizome, thick at the base, with a strong annulus at the base of the leaves. Leaves densely packed at the base of the stem; lower leaves resembling those of a *Cymodocea* in texture, $2\frac{1}{4}$–3 in. long, $\frac{1}{8}$–$\frac{3}{16}$ in. broad, thick, half-folded at the base, flat towards the apex, 5-nerved, with numerous waved cross veins, rigid, spreading-erect, and deeply striated; middle leaves less rigid, 1–3-nerved, with the adnate stipules large and entire at the apex; upper leaves linear-filiform, 1–3-nerved. Peduncles short; spikes short. No fruit seen.

Mozamb. Dist. British Central Africa: Lake Nyasa; in the south-western

bay, *Kirk !* Kambone (Livingstonia) Lagoon, *Laws*, 3! Lukoma (Likoma Island?), *Bellingham !*

A remarkable species, combining the habit of *P. Robbinsii*, Oakes and *P. pectinatum*, Linn., but with the basal portion quite like a *Cymodocea*, in texture and rigidity. The lower stipules have membranous edges and strong fibres, which become frayed at the apex.

The following species have been recorded from the African continent, but not within the tropics, where, however, they are likely to occur: *P. americanus*, Cham., and *P. natans*, Linn., occur in both North and South Africa; *P. Friesii*, Rupr., and *P. alpinum*, Balb., in South Africa; *P. Zizii*, Roth, *P. densum*, Linn., *P. trichoides*, Cham., and *P. perfoliatum*, Linn., in North Africa. *P. Zizii*, Roth, has also been found in Madagascar.

4. **RUPPIA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 1014.

Perianth none. Stamens 2; anthers 2-celled. Carpels 4, 1-ovuled; stigma sessile. Fruit of 4 long-stalked, ovoid, or oblique-ovoid achenes on a common peduncle. Seeds uncinate; radicle large.—Submerged, slender, brackish-water plants. Leaves elongate, filiform; sheaths stipule-like. Flowers small, 2–6 (usually 2) together within the leaf-sheath, on a short peduncle which mostly elongates, and becomes straight or spirally twisted.

Species 1 or more? or many sub-species? In all temperate and tropical regions.

Leaf-sheaths inflated . . . . . 1. *R. spiralis.*

Leaf-sheaths not inflated . . . . . 2. *R. rostellata.*

1. **R. spiralis,** *Dum. Fl. Belg. Prod.* 164. Leaf-sheaths inflated. Peduncles spirally coiled. Drupes nearly straight.—*R. maritimus*, var. *spiralis*, Aschers. in Aschers. & Schweinf. Ill. Fl. Égypte, 144; Durand & Schinz, Conspect. Fl. Afr. v. 497.

Upper Guinea. Senegal, *Leprieur !*

Also in Egypt.

R. acaulis, Gay MSS., may be a small form of the above rather than of *R. rostellata*, judging by the fruits, &c. It was collected in Senegal by *Leprieur*.

2. **R. rostellata,** *Koch in Reichb. Pl. Crit.* ii. 66, *t.* 174. Leaf-sheaths not inflated. Peduncles short at the time of flowering, not spirally coiled. Drupes obliquely ovoid.—*R. maritima*, Rendle in Cat. Afr. Pl. Welw. ii. 94, not of Linn.

Upper Guinea. Lower Niger, *Vogel !*

Lower Guinea. Angola: Pungo Andongo; in a slowly flowing salt stream at Salinas do Dungo, *Welwitsch*, 245.

5. **ZANNICHELLIA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 1016.

Male flowers: Anthers 2–4-celled; filaments slender. Female flower with a membranous perianth. Carpels variable; style long or

short; stigma peltate, crenate. Fruit of 4 (rarely less or more) long, incurved achenes. Seeds pendulous, cotyledonary end folded on itself. —Slender submerged fresh, brackish, or salt water plants. Leaves mostly opposite, linear or capillary, with stipular sheaths. Flowers small, in pairs or solitary, in a membranous perianth.

Species 4–6? Temperate and Tropical regions.

1. **Z. palustris,** *Linn. Sp. Pl. ed.* i. 969. Fruit sessile, or subsessile; bract about half as long as the rest of the fruit.—A. Bennett in Dyer, Fl. Cap. vii. 50.

Lower Guinea. German South-west Africa: Amboland; Kilevi, *Schinz*, 12!

Also in North and South Africa, and Madagascar.

6. **ZOSTERA**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 1017.

Male flowers of single sessile anthers. Female flower of a solitary 1-ovuled carpel; style persistent; stigmas 2. Fruit membranous. Embryo grooved.—Submerged marine plants with dark ribbon-like leaves. Rootstocks matted, creeping. Stem compressed. Leaves sheathing, long, linear; stipules adnate to the sheathing leaf-base. Flowers in series of anthers and carpels on one surface of a linear spadix, enclosed in a leaf-like spathe.

Species 4. Coasts of Europe, Asia, and America.

1. **Z. nana,** *Roth, Enum. Pl. Germ.* i. 8. Leaves narrowly linear, 1–3-nerved. Peduncle of spathe filiform; spadix strap-shaped oblong, with small inflexed bands. Fruit shorter than in *Z. marina*, and nearly smooth.—A. Bennett in Dyer, Fl. Cap. vii. 51. *Z. minor*, Nolte ex Reichb. Ic. Fl. Germ. vii. 2. *Z. pumila*, Le Gall, Congr. Sc. Fr. xvi. i. 144. *Halodule* (?) *Wrightii*, Aschers. in Sitz. Ges. Naturf. Fr. Berl. 1868, 19, and in Anleit. z. Wissenschaft. Beobacht. 1888, 201 (ex Durand & Schinz, Conspect. Fl. Afr. v. 502).

Lower Guinea. Angola: Ambriz; plentiful near the mouth of the River Loje, near Ambriz, *Welwitsch*, 246B! Loanda; plentiful all along the shore, *Welwitsch*, 246!

Also in Madagascar, North and South Africa, Atlantic Ocean, Black and Caspian seas.

I have seen no specimens of *Zostera marina*, Linn., from Tropical Africa; but it occurs in North and South Africa.

7. **NAIAS**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 1018.

Male flower solitary. Anther 1–4-celled in 2 sheaths or tubes. Female flower: Perianth 0, or membranous and adherent. Carpel 1; stigmas 2–4, slender; ovule erect. Achene oblong. Seed erect; embryo straight.—Submerged plants with branched filiform smooth or

muricate stems. Leaves linear, entire, or toothed, alternate, opposite, or whorled. Flowers diœcious or monœcious, axillary and small.

Species about 32, in all temperate and tropical regions.

Diœcious . . . . . 1. *N. marina.*
Monœcious.
  Male and female flowers without a spathe . . 2. *N. graminea.*
  Male and female flowers in a spathe.
    Female spathe with a terminal outgrowth . . 3. *N. affinis.*
    Female spathe without a terminal outgrowth.
      Sheaths with short obtuse auricles . . . 4. *N. Schweinfurthii.*
      Sheaths truncate or rounded . . . . 5. *N. Welwitschii.*
Male flowers only in a spathe.
  Anthers 1-celled . . . . . 6. *N. minor.*
  Anthers 4-celled.
    Leaves falcate . . . . . 7. *N. horrida.*
    Leaves not falcate . . . . . 8. *N. interrupta.*

1. **N. marina,** *Linn.*, var. **muricata,** *Al. Br. ex K. Schum. in Mart. Fl. Bras.* iii. iii. 725. Stem thickly covered with spines. Leaves linear, with 14–20 patent triangular marginal teeth, which are generally longer than the blade is broad, and with about 5 on the back; sheaths rounded at the edges, each with 2 teeth on the edge, and 1–3 spines on the back.—Rendle in Trans. Linn. Soc. ser. 2, Bot. v. 397, 440.

Nile Land. British East Africa : in the Albert Nyanza, *Stuhlmann*, 2841 (ex *Rendle*).

2. **N. graminea,** *Del. Fl. Égypte,* ii. 282, *t.* 50, *fig.* 3. Stems elongated, rooting at the lower nodes, from a few inches to 2 ft. long. Leaves linear, narrowing upwards, spreading-recurved, sometimes with a plumose habit, and other times lax and weak, with 36–40 teeth on the margins; sheaths elongated, with pointed lanceolate auricles, and 8–10 teeth on the margin. Flowers in the axils sometimes female only, sometimes with a male and female side by side. Male perianths ending above the anthers in the ear-like lobes. Fruits solitary or 2–4 together, narrow-oblong, or ellipsoid-oblong, tapering at the apex. Seed-testa marked with 25–30 regular lines of small areolæ.—Durand & Schinz, Conspect. Fl. Afr. v. 499; Kunth, Enum. iii. 115; Schweinf. Beitr. Fl. Aethiop. 194 and 292.

Nile Land. Kordofan : Omkenem, near Arashkol Mountain, *Steudner*, 213! British East Africa: Jur; Kurshook Ali's Seriba, *Schweinfurth*, 1217! Jur Ghattas, *Schweinfurth*, 2140 partly! Kinani, in the East Ongalea Mountains, *Gregory!*

Widely distributed in the Eastern Hemisphere.

3. **N. affinis,** *Rendle in Trans. Linn. Soc. ser.* 2, *Bot.* v. 440. Stems slender. Leaves with 12–18 teeth on either margin, a quarter of the leaf-width in length; sheath irregularly broken on the upper margin and shoulders into short narrow outgrowths, tipped with spine-cells, the outgrowths may extend almost to the base of the sheath. Female flowers apparently not quite mature. Spathe ellipsoid with a

cylindrical neck, passing above into a pair of long narrow spine-tipped outgrowths, overtopping the two stigmas.

Upper Guinea. Senegal, *Leprieur* (ex *Rendle*).

Described from a specimen in the Cosson Herbarium at Paris. Clearly allied to *N. Welwitschii*, Rendle, from which it is distinguished by a less lax habit, the tuft-like dense-leaved terminal branchlets, the more regularly toothed spreading firmer leaves, fimbriate leaf-sheath, and the pair of terminal outgrowths on the female spathe.

4. **N. Schweinfurthii,** *Magnus in Ber. Deutsch. Bot. Gesellsch.* xii. 220. Plant small with spreading branches. Leaves thin, slender, tapering; marginal teeth about 12, ending in a brown spine about half the leaf-width in length; sheath-auricles with 3–4 erect teeth. Male flowers shortly pedicellate. Spathe oblong. Anther 1-celled. Female flower: Spathe oval-oblong, produced into a neck around the long style; stigmas unequal at the apex.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2140 partly!

This is mixed with *N. graminea*, Delile.

5. **N. Welwitschii,** *Rendle in Cat. Afr. Fl. Welw.* ii. 95. Stems spreading, 12 in. long, rooting at the nodes. Leaf-blades $\frac{3}{4}$–1 in. long, with an evident midrib, and in the older leaves transverse markings; marginal teeth 12–16, broadly subtriangular, ending in a brown spine; leaf-apex spinulate; sheaths 1 lin. long and nearly or quite as broad. Male flowers subsessile, nearly $1\frac{1}{2}$ lin. long. Anthers 4-celled. Female flowers 1 lin. long by $\frac{1}{3}$ lin. in diam., very pale brown.—Trans. Linn. Soc. ser. 2, Bot. v. 401.

Lower Guinea. Angola: Barra do Bengo; in the large lake of Quifandongo, near Quisequele, *Welwitsch*, 247! Barra do Dande; lakes on the left of the river Dande, called Lagoas de Bombo, *Welwitsch*, 247B!

6. **N. minor,** *All. Fl. Pedem.* ii. 221. Stem branched from just above the base, very variable in habit and length (3 to 12 in.), sometimes lax, sometimes bushy, with all intermediate states. Leaves variable in length, generally bent backwards, with 10–20 teeth on the margins; sheaths rounded-truncate, with 5–8 prominent teeth on either shoulder. Male and female flowers often alternating in the leaf-sheaths; spathe elongated, ellipsoid, with a short neck, irregularly toothed at the mouth; female flowers about $1\frac{1}{4}$ lin. long. Ovary sessile, about $\frac{5}{12}$ lin. long; style long; stigmas 2, unequal. Fruit linear-oblong, narrowed at the apex, 1–$1\frac{1}{2}$ lin. long, $\frac{1}{4}$ lin. in diam. Seeds with many rows of elongated ladder-like pits.—Kunth, Enum. iii. 113. *Caulinia fragilis*, Willd. in Mém. Acad. Roy. Sci. Berl. 1798, 88, t. 1, fig. 2.

Nile Land. British East Africa: "Emin Pasha Expedition," *Herb Schweinfurth*, 4242!

Also in Europe, Asia, and North Africa.

7. **N. horrida,** *A. Br. in Magnus, Beitr. Kennt. Gatt. Najas, p.* vii. *and* 46. Stems long, spreading, with short lateral branches and short internodes, forming at length dense bushy heads. Leaves falcate, with teeth longer than the leaf-widths and a rigid brown spine at the apex; sheaths broad, rounded-truncate, with 4–6 minute teeth. Male flower subellipsoid. Fruit tapering above. Seed marked with 20 rows of pits.—Rendle in Trans. Linn. Soc. ser. 2, Bot. v. 422 and 443. *N. pectinata,* Magnus in Aschers. & Schweinf. Ill. Fl. Égypte, 145; Durand & Schinz, Conspect. Fl. Afr. v. 500.

Upper Guinea. Senegambia: Lake Guier, *Roger;* Marsh of Walo, near Keurmbaye, *Leprieur.* Niger Territory: Nupe; in a deep lake near Jeba, *Barter,* 1065! Cameroons: Elephant Lake, near Barombi, *Preuss,* 452! Johann-Albrechts Höhe, *Staudt,* 488!

Nile Land. Fazokl, *St. Ange,* 81! Bahr el Ghazal, *Schweinfurth,* 1137! at the mouth of the River Jur, *Schweinfurth,* 1228!

Mozamb. Dist. Lake Tanganyika, *Hore!*

Also in North and South Africa.

8. **N. interrupta,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 94. Stem slender and wiry; internodes elongated. Leaves short, with 10–12 teeth on the margins; basal auricle truncate, entire. Female flowers with 2–3 stigmas. Fruit fusiform, dull yellowish.—A. Bennett in Dyer, Fl. Cap. vii. 51; Rendle in Trans. Linn. Soc. ser. 2, Bot. v. 423.

Mozamb. Dist. German East Africa: in Lake Victoria at Kageyi, *Fischer,* 614!

Also in South Africa.

N. australis, Bory, and *N. madagascariensis,* Rendle, occur in the Mascarene Islands.

8. CYMODOCEA, Konig; Benth. et Hook. f. Gen. Pl. iii. 1018.

Flowers axillary, unisexual, or bisexual, in membranous sheaths. Perianth 0. Male flowers: Anthers 2, long, connate, stipitate, extrorse. Female flowers: Carpels 2, subsessile, ovoid, compressed, 1-ovuled; style short; stigmas subulate; ovule pendulous, orthotropous. Fruit of 2 ovoid carpels. Seeds pendulous; testa thick; embryo inflexed.—Submerged marine plants, with rigid jointed and creeping rootstocks. Leaves oblong or linear, with stipular sheaths.

Species 5–8? Shores of the Indian and Pacific Oceans.

Leaves not terete.
- Leaves falcate . . . . . 1. *C. ciliata.*
- Leaves straight.
  - Leaves broad . . . . . 2. *C. serrulata.*
  - Leaves $\frac{1}{6}$ in. or less wide.
    - Leaves 3-nerved . . . . . 4. *C. australis.*
    - Leaves 7-nerved . . . . . 5. *C. nodosa.*
    - Leaves 9–13-nerved . . . . . 6. *C. rotundata.*

Leaves terete, grooved . . . . . 3. *C. isoëtifolia.*

1. **C. ciliata,** *Ehrenb. ex Aschers. in Sitzb. Ges. Naturf. Fr. Berl.* 1867, 3. Stem 3–12 in. long, woody, branched, covered with annular scars. Leaves 3–6 in. by $\frac{1}{2}$–$\frac{2}{3}$ in., linear-falcate, tip rounded, ciliate-serrulate.—Linnæa, xxxv. 162; Durand & Schinz, Conspect. Fl. Afr. v. 500; Schweinf. Beitr. Fl. Aethiop. 292, 309. *Thalassia ciliata,* Konig in Konig & Sims, Ann. Bot. ii. 97; Kunth, Enum. iii. 120. *Zostera ciliata,* Forsk. Fl. Ægypt.-Arab. 157.

Nile Land. Shore of the Red Sea at Hanish Island, *Slade!*

Mozamb. Dist. German East Africa: Rovuma Bay, *Kirk!* Portuguese East Africa: at the mouth of the West Luabo River, *Kirk,* 10!

Also on the shores of Egypt, Arabia, India, the Mascarene Isles, and Queensland.

2. **C. serrulata,** *Aschers. & Magnus in Sitzb. Ges. Naturf. Fr. Berl.* 1870, 84. Stems long, creeping. Leaves 4–6 in. by $\frac{1}{6}$–$\frac{1}{4}$ in., linear, nearly straight, tip entire or denticulate.—*Posidonia serrulata,* Spreng. Syst. i. 181. *Phucagrostis ciliata,* Ehrenb. & Hempr. Symb. Bot. t. vi. ex Aschers. in Linnæa, xxxv. 162.

Nile Land. Shore of the Red Sea at Suakin, *Schweinfurth,* 197!

Shores of the extra-tropical part of the Red Sea, and of the Indian and Pacific Oceans.

3. **C. isoëtifolia,** *Aschers. in Sitzb. Ges. Naturf. Fr. Berl.* 1867, 3. Stem short. Leaves terete, grooved, 3–5 in. by $\frac{1}{12}$–$\frac{1}{10}$ in., glaucous, tip 3-toothed.—Flowers in dichotomous cymes.—Linnæa, xxxv. 163; Durand & Schinz, Conspect. Fl. Afr. v. 501. *C. æquorea,* Kunth, Enum. iii. 118 (excl. syn.).

Nile Land. Shore of the Red Sea at Suakin, *Schweinfurth,* 198! British East Africa: Lamu Harbour, *Hildebrandt,* 1914!

Also on the shores of the Red Sea north of the Tropic, and of the Indian Ocean.

4. **C. australis,** *Trimen, Cat. Ceylon Pl.* 99. Stem long, creeping. Leaves 5–7 in. by $\frac{1}{8}$–$\frac{1}{6}$ in., linear, nearly straight, tip rounded or truncate and 3-toothed.—*Halodule australis,* Miq. Fl. Nederl. Ind. iii. 227; Aschers. in Sitzb. Ges. Naturf. Fr. Berl. 1867, 4; Durand & Schinz, Conspect. Fl. Afr. v. 501. *Diplanthera tridentata,* Steinh. in Ann. Sc. Nat. sér. 2, ix. 98. *Zostera uninervis,* Forsk. Fl. Ægypt.-Arab. cxx. and 157.

Nile Land. Eritrea: Massowa, *Schweinfurth,* 5! Danakil coast, near Hamfila, *Hildebrandt,* 701!

Also on the shores of Arabia and the Indian Ocean.

5. **C. nodosa,** *Aschers. in Sitzb. Ges. Naturf. Fr. Berl.* 1869, 4. Rhizome purple, thick, creeping. Leaves narrowly linear, 7-nerved, denticulate upwards. Male flowers long peduncled, larger than the leaves. Carpels half-ovoid, slightly keeled, entire or indistinctly repand.—Boiss. Fl. Or. v. 21. *C. æquorea,* Konig in Konig & Sims, Ann. of Bot. ii. 96, t. 7. *Zostera serrulata,* Targ.-Tozz. Cat. Veg. Mar. 90.

Upper Guinea. Mouths of rivers, Senegambia (ex *Boissier*).

Shores of the Mediterranean Sea and the Canaries.

6. **C. rotundata,** *Aschers. & Schweinf. in Sitzb. Ges. Naturf. Fr. Berl.* 1870, 84. Near *C. nodosa*, Aschers., but differs in the leaves being 9–13-nerved, and the carpels strongly keeled, acute and dentate.

Nile Land. Shore of the Red Sea near Suakin, *Schweinfurth*, 188!

Also on the shores of Arabia and Madagascar.

ORDER CLIV. ERIOCAULEÆ. (By N. E. Brown.)

Flowers very small, regular or irregular, unisexual, bracteate or ebracteate, very densely crowded into globose, hemispherical, oblong or campanulate heads. Calyx of 2–3 equal or unequal, free or variously connate, scarious or submembranous sepals, very rarely absent, often more or less hairy on the back near the apex, or ciliate. Corolla usually separated from the calyx by a distinct stipes, sometimes rudimentary, especially in the male flowers, rarely absent; petals 2–3, free or variously connate, equal or unequal, membranous and hyaline or moderately thick and opaque, with or without a gland on their inner face, often ciliate or hairy. Stamens equal in number to the petals and inserted upon them at or above their base, or 4 or 6 (or by abortion fewer) in two series, the one alternating with the petals, the other opposite to them; filaments free, filiform or slightly flattened; anthers small, dorsifixed, ovate, oblong or subquadrate, 1–2-celled, opening longitudinally. Staminodes in the female flowers rare, when present minute. Pistil in the male flowers very rudimentary, reduced to 2–3 minute glands. Ovary of the female flowers superior, 2–3-celled; style terminal, divided above into 3 simple or bifid, filiform branches, with or without three other branches or appendages alternating with them or arising from the style below them; ovules solitary in each cell, pendulous, orthotropous. Fruit a 2–3-celled capsule; cells opening longitudinally at the back. Seeds solitary in each cell, pendulous, ellipsoid or subglobose; testa thin, striate, reticulate or very minutely papillate-tuberculate; albumen firm; embryo minute, lenticular, seated at the apex of the albumen opposite the hilum.—Perennial or annual herbs, growing in water, swamps, bogs, or on dry ground, stemless or with simple or branched leafy stems. Leaves linear or subulate, alternate, arranged in a dense or lax rosette or scattered along the stem. Peduncles one to many to a plant, each with a tubular sheath at the base, one- or rarely several-headed. Heads monœcious, or rarely with the sexes in separate heads. Involucral or outer bracts in 2 to several series, imbricate, sometimes radiating beyond the circumference of the flowering part of the head, membranous, scarious or rigid. Flowering-bracts solitary under each flower, variable in form, often hairy or ciliate at the apex, rarely absent. Receptacle flat, convex, subglobose or elongated, glabrous, pilose or villous. Flowers usually very numerous, very small or minute, pedicellate or sessile; the females usually in the outer part of the head, rarely central, sometimes irregularly intermingled with the male flowers, rarely separated in distinct heads.

A very distinct order of 6 genera and about 360 species, distributed throughout

the warmer regions of both hemispheres, most numerous in Tropical America, very few in the temperate regions.

The species of this order are often very difficult to discriminate on account of their great similarity and minute floral structure. For dissection, however, the dried flower-heads do not require to be boiled, since if placed in a drop of cold water they absorb it with very great rapidity and are immediately ready for dissection, but they require to be examined under a lens of high power. The structure of the flowers and sometimes the hairs on the sepals are best seen if examined in water, but the hairs on the receptacle and on the flowering bracts are best seen when in a dry state, especially when the hairs on the latter are very fine and not of the more usual stout, opaque-white type. The shape of the peduncle is described as seen in thin transverse sections in water, where, by a little manipulation, it may easily be made to assume its original outline, which cannot be correctly determined otherwise.

Stamens twice as many as the petals, 4 or 6, or fewer by abortion, in two alternating series. Style-branches 3, without alternating appendages. (See also *Pæpalanthus Welwitschii*, in which the alternating non-stigmatic appendages are absent.)	
Petals free, sometimes rudimentary, rarely absent .	1. ERIOCAULON.
Petals connate into a tube, but with free claws in the female flowers	2. MESANTHEMUM.
Stamens equal in number to the petals and opposite to them, in one series. Style-branches 6, 3 of them stigmatose, simple or bifid, and 3 others alternating with them or arising from the style lower down, not stigmatic and usually shorter and stouter. Petals of the male flowers connate into a minute funnel-shaped tube; of the female flowers free, or connate into a tube at their middle or upper part, with free claws	3. PÆPALANTHUS.

1. **ERIOCAULON**, Linn.; Benth. et Hook. f. Gen. Pl. iii. 1020.

Sepals 2–3, very rarely absent; in the female flowers free, equal or unequal, all concave, boat-shaped, flattened or filiform, rounded or keeled on the back, or the 2 lateral concave or boat-shaped and the third much narrower and flattened or filiform, often bearded on the apical part, or ciliate; in the male flowers free or variously combined. Petals 2–3, sometimes rudimentary or absent in the male flowers, rarely wanting in the female flowers, free, often with a gland on the inner face near the apex, glabrous, ciliate or hairy. Stamens in two series, double the number of the petals or by abortion fewer; anthers 2-celled. Staminodes in the female flowers none. Ovary 2–3-celled; style-branches 2–3, simple, filiform, without alternating appendages.—Marsh or aquatic herbs, usually stemless, with the leaves all radical, or occasionally with the stem or rhizome elongated below the tuft of leaves, or in a few species with a simple or branched leafy stem. Peduncles one-headed. Heads globose, hemispherical or oblong, rarely campanulate. Flowering bracts oblong, obovate or linear, concave or flattish. The other characters as for the Order.

Species about 160, found in all the warmer parts of both hemispheres, and in

North Asia, China, Japan, and North America, one species in the British Isles, otherwise absent from Europe.

In using the following key to the species actual measurements must be made, they cannot be guessed; and it is necessary to be quite certain that the female flower under examination is perfect, because the sepals in some of the species are most easily detached; also, in some of the species, the two lateral sepals are large and conspicuous, whilst the third sepal is very slender and sometimes clings to the petals, therefore being easily overlooked; hence it requires great care in many cases to make sure of the correct number of sepals; the number of petals, however, in most cases, corresponds with the number of the sepals.

Involucral-bracts (at least in the younger heads) spreading and radiating beyond the flowering part of the heads; female flowers with 3 sepals and 3 petals. (See also 30, *E. Schlechteri*, in which they are said to be slightly longer than the flowers, but are not described as radiating.)
- Involucral-bracts always radiating; peduncles 1–2¼ in. long.
  - Involucre 1–2 lin. in diam.; receptacle glabrous . 2. *E. pumilum.*
  - Involucre 2½–4 lin. in diam.; receptacle densely pilose . . . . . 3. *E. xeranthemoides.*
- Involucral-bracts radiating in the younger heads, afterwards reflexed against the peduncle and partly hidden by the flowers; peduncles 5–8 in. long . . . . . 28. *E. infaustum.*

Involucral-bracts never radiately spreading beyond the flowering part of the head. (In 1, *E. longipetalum*, erect, forming a campanulate cup slightly exceeding the disk.)
- Female flowers without petals and sometimes without sepals also; leaves ¼–½ lin. broad, linear, tapering to a very fine point or almost capillary.
  - Heads pale brown; sepals of the female flowers entirely absent or 2 and filiform, placed at the middle of pedicel . . . . . 36. *E. Heudelotii.*
  - Heads dark chestnut or blackish; sepals of the female flowers 2, linear-lanceolate, acute, placed close under the ovary; sepals of the male flowers free . . . . . 37. *E. amboense.*
  - Heads pale brown? sepals of the female flowers unequal, narrowly linear; sepals of the male flowers connate . . . . . 38. *E. Stuhlmanni.*

Female flowers with sepals and petals always present.
- Female flowers with 2 sepals and 2 petals. (See also 34, *E. gilgianum*, of which the number of sepals and petals is not stated.)
  - A very small annual, ¼–½ in. high; peduncles not longer than the leaves; one of the petals very much longer than the rest and protruded much beyond the sepals . . . 1. *E. longipetalum.*
  - Plant 1–4½ in. high; peduncles 2–6 times as long as the leaves; petals equal or subequal . . 33. *E. mutatum.*
- Female flowers with 2 sepals and 3 petals: sepals of the male flowers very different from those of the females.

Flowering-bracts with a transverse fuscous band near the apex; sepals of the female flowers fuscous . . . . . 24. *E. plumale.*
Flowering bracts and sepals of the female flowers entirely straw-coloured . . . . . 25. *E. senegalense.*
Female flowers with 3 sepals and 3 petals.
Peduncles shorter than or about equalling the leaves. (See also 6, *E. bifistulosum* and 31, *E. subulatum*.)
Plant 1½–2 in. high; involucral-bracts light straw-coloured . . . . . 4. *E. Volkensii.*
Plant 5–7 in. high; involucral-bracts fuscous, darker towards the apex . . . . . 5. *E. Thunbergii.*
Peduncles longer than the leaves, usually 2 to many times as long. (In 31, *E. subulatum*, the peduncles are not much longer than the leaves, which is sometimes the case in 12, *E. Schimperi*, and in 6, *E. bifistulosum*, they are sometimes shorter than the leaves.)
*Flowering-bracts glabrous and not ciliate; heads glabrous to the eye. (See also 26, *E. zambesiense*, in which the outer flowering-bracts are nearly or quite glabrous, and 13, *E. mesanthemoides*, 30, *E. Schlechteri* and 34, *E. gilgianum*, in which they are described as somewhat glabrous, "glabriusculis.")
†Sepals of the female flowers glabrous and not ciliate. (See also †† and †††, where the hairs may easily be overlooked unless sufficiently magnified.)
‡Receptacle pilose. (In 35, *E. abyssinicum*, the receptacle appears to have here and there a hair, but is scarcely pilose.)
Leaves ½–2¾ (usually more than 1) lin. broad.
Heads yellowish-white or light straw-coloured, 2½–3 lin. in diam.; sepals of the female flowers all filiform . . . . . 16. *E. bongense.*
Heads blackish or brown, 1½–2¼ lin. in diam.
Lateral sepals of the female flowers shortly acute or obtuse, very gibbous-keeled; heads exactly globose . . . . . 17. *E. Buchanani.*
Lateral sepals of the female flowers acuminate, almost awned, gibbous-keeled; heads somewhat truncate at the base . . 18. *E. andongense.*
Heads pinkish-buff or deep tawny, 1¾–2 lin. in diam.; lateral sepals of the female flowers obliquely obtriangular, deeply hooded, slightly gibbous-keeled . . 19. *E. fulvum.*

Leaves $\frac{1}{3}$–$\frac{1}{2}$ lin. broad; heads 1–$1\frac{1}{2}$ lin. in diam., slightly echinulate from the whitish bracts exceeding the flowers; sepals of the female flowers linear-lanceolate, very acute — 20. *E. Welwitschii.*

‡‡Receptacle glabrous. (See also 20, *E. Welwitschii*, var. *pygmæum*.)

Leaves numerous, capillary or filiform, 1–$3\frac{1}{2}$ in. long; heads 1–2 lin. in diam.; sepals of the female flowers obovate, deeply hooded, obtuse . — 6. *E. bifistulosum.*

Leaves few, $\frac{1}{3}$–$\frac{3}{4}$ in. long; heads 1–$1\frac{1}{4}$ lin. in diam.; sepals of the female flowers lanceolate, acuminate . — 35. *E. abyssinicum.*

††Sepals of the female flowers ciliate on the margins, otherwise quite glabrous.

Leaves subulate, $\frac{1}{4}$–$\frac{1}{2}$ lin. broad, firm; heads $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam. . . — 31. *E. subulatum.*

Leaves filiform, $\frac{1}{8}$–$\frac{1}{4}$ lin. broad, weak; heads 1–$1\frac{1}{4}$ lin. in diam. . . — 32. *E. ciliisepalum.*

†††Sepals of the female flowers with a few minute hairs on the back, chiefly on the keel, not ciliate.

Leaves 2–4 in. long, not exceeding $\frac{1}{3}$ lin. in greatest breadth; heads black . — 7. *E. submersum.*

Leaves 5–9 in. long, $\frac{1}{2}$–$1\frac{1}{4}$ lin. broad, tapering to a very fine point; heads fuscous, with a whitish involucre . — 9. *E. stoloniferum.*

**Flowering-bracts, or at least those in the centre of the head, bearded, pubescent or ciliate on the apical part, or between the middle and the apex, not perfectly glabrous.

†Sepals of the female flowers glabrous and not ciliate. (See also 30, *E. Schlechteri*, which is described as having the sepals nearly glabrous.)

Plants with a distinct elongated stem or rhizome below the leaves, which are 1–$3\frac{1}{2}$ in. long.

Leaves very numerous filiform, gradually tapering to a very fine point; peduncles several or very numerous; heads fuscous or blackish . . — 6. *E. bifistulosum.*

Leaves not very numerous, linear, rather abruptly subacute; peduncles 1–3 to a plant; heads whitish-brown . — 8. *E. Mannii.*

Plants stemless below the leaves; leaves linear; peduncles very numerous; heads blackish or dark brown . . — 17. *E. Buchanani.*

††Sepals of the female flowers bearded pubescent or ciliate on the apical part, not perfectly glabrous.

Sepals of the female flowers deeply concave, with a broad thick very gibbous

keel, blackish or dark fuscous, hairy inside and bearded with white hairs at the apex . . . . . 26. *E. zambesiense.*

Sepals of the female flowers boat-shaped, sometimes gibbous, but the keel neither very thick nor very broad, never hairy inside (not seen in 14, *E. decipiens*, and imperfectly described in 21, *E. Teusczii*).

‡Leaves usually more than 3 in. long. (Occasionally in 11, *E. latifolium*, some of the leaves are only 1½–2 in. long.)

Leaves obtuse or shortly subacute, 1–4 lin. broad, thin and somewhat flaccid; heads 3–4 lin. in. diam.; sepals of the female flowers very pale brownish-white, bearded with long white hairs . 11. *E. latifolium.*

Leaves obtuse, firm, 3–6 lin. or more broad; sepals of the female flowers dark fuscous, bearded with white hairs.

Heads 4–5 lin. in. diam.; peduncles with about 8 obtuse ribs . . . . . 12. *E. Schimperi.*

Heads 6–7 lin. in diam.; peduncles with about 11 slender remarkably prominent ribs . 13. *E. mesanthemoides.*

Leaves gradually tapering to a very acute point . . . . 14. *E. decipiens.*

‡‡Leaves ⅓–3 in. long, usually under 2 in. long, except in very large specimens of 29, *E. elegantulum*. (See also 11, *E. latifolium*.)

§Heads 3–5 lin. (or more?) in diam. (Perhaps 22, *E. huillense* belongs, here, but no dimensions are given in the description.)

Leaves acute, ¾ lin. broad; peduncles up to 7 in. long; sepals of the female flowers boat-shaped, toothed on each margin, blackish, sparsely hairy . . . . . 10. *E. Antunesii.*

Leaves obtuse or subacute, ¾–2¼ lin. broad; peduncles 6–24 in. long.

Receptacle pilose; sepals of the female flowers whitish, faintly tipped with fuscous, bearded with short white hairs . . . 15. *E. lacteum.*

Receptacle "apparently glabrous"; sepals of the

female flowers pure white, hairy at the apex . .	21. *E. Teusczii.*
§§Heads less than 3 lin. in diam.	
Involucral bracts blackish, fuscous or greenish-grey.	
Sepals of the female flowers dark fuscous . .	29. *E. elegantulum.*
Sepals of the female flowers "yellowish" or "pale greenish-yellow."	
Leaves 9–15 lin. long, 1–1½ lin. broad, 7–9-nerved.	30. *E. Schlechteri.*
Leaves 4–7 lin. long, ¼ lin. broad, 1-nerved; heads ¾ lin. in diam. . .	34. *E. gilgianum.*
Involucral-bracts pale straw-coloured or brownish-white.	
Peduncles several-ribbed; petals much shorter than the sepals, with a black gland near the apex .	22. *E. huillense.*
Peduncles 3–5-angled as seen in thin transverse sections in water; petals equalling or exceeding the sepals.	
Petals unequal, the largest ¼–⅓ lin. broad, oblanceolate, thick, all ciliate and the largest with hairs on both sides, glandless . .	23. *E. afzelianum.*
Petals subequal, ⅛ lin. broad, linear-cuneate, thin and rather membranous, ciliate, glabrous on both sides, with or without a minute apical gland .	27. *E. Hanningtonii.*

1. **E. longipetalum,** *Rendle in Cat. Afr. Pl. Welw.* ii. 96. A very small plant, ¼ to ½ in. high, apparently an annual, of rosette-like habit. Leaves numerous, 3–8 lin. long, not exceeding ¼ lin. broad at the base, capillary-subulate, glabrous. Peduncles very numerous, not exceeding the leaves, 2–5 lin. long, slender, subtrigonous or subquadrangular, glabrous, their sheaths nearly or quite as long, open nearly to the base, acute, shortly hairy at the very base. Heads ¾–1 lin. in diam., campanulate, whitish or greenish-white, few to about 10-flowered, with 1 or 2 central male flowers surrounded by females. Involucral bracts ⅔ lin. long, ¼ lin. broad, erect, slightly exceeding the disk, oblong, obtuse or minutely bifid at the apex, glabrous, slightly shining, whitish. Flowering bracts similar to those of the involucre, about as long, ¼–⅓ lin. broad, glabrous. Receptacle glabrous. Female flowers subsessile,

lyre-shaped. Sepals 2, usually equal, $\frac{3}{5}$–$\frac{2}{3}$ lin. long, $\frac{1}{8}$ lin. broad, linear-sigmoid, acute, subacute, or obtuse, glabrous, whitish; keel as broad as the sides of the sepal. Petals 2, very unequal, linear, subobtuse, whitish, glabrous; the longer 1 lin. or rather more long, $\frac{1}{10}$ lin. broad, much exceeding the sepals, twisted at the middle; the shorter $\frac{1}{3}$–$\frac{3}{5}$ lin. long. Male flowers shortly pedicellate. Sepals 2, equal, $\frac{1}{3}$–$\frac{1}{2}$ lin. long, $\frac{1}{4}$ lin. broad, elliptic-oblong, obtuse, concave, whitish. Petals minute, $\frac{1}{8}$–$\frac{1}{4}$ lin. long, subulate. Stamens 4; anthers black. Seeds ellipsoid, with a flat side, light reddish-brown, with a yellowish reticulation.

Lower Guinea. Angola: Huilla; in spongy places formed by Algæ on the higher parts of Morro de Lopollo, 3800–5500 ft., *Welwitsch*, 2446!

A minute and very distinct species, well characterised, as Dr. Rendle observes, by its dense habit and the long protruding petal of the female flower.

2. **E. pumilum,** *Afzel. ex Körnicke in Linnæa*, xxvii. 621. Plant 1–2$\frac{1}{4}$ in. high. Leaves tufted, 3–6 lin. long, $\frac{1}{4}$–$\frac{1}{2}$ lin. broad, linear-subulate, very acute, flat, glabrous, 3-nerved. Peduncles 8–14 to a plant, 1–2$\frac{1}{4}$ in. long, acutely 3–4-angled, setaceous, glabrous, their sheaths 7–8 lin. long, oblique at the apex, glabrous. Heads monœcious, few-flowered, glabrous, including the involucre 1–2 lin. in diam. Involucral-bracts radiating beyond the flowers, $\frac{1}{2}$–1$\frac{1}{4}$ lin. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad, oblong, obtuse, or acute, glabrous, scarious, white, shining. Flowering-bracts $\frac{1}{4}$–$\frac{1}{3}$ lin. long, obovate-oblong, concave, obtuse or subacute, glabrous, white. Receptacle glabrous. Female flowers 7–9, very shortly pedicellate. Sepals 3, free, unequal, about $\frac{1}{3}$ lin. long, $\frac{1}{12}$–$\frac{1}{10}$ lin. broad, linear, acute, glabrous, white. Petals 3, inserted higher than the sepals, unequal, $\frac{1}{3}$ lin. long, $\frac{1}{12}$–$\frac{1}{9}$ lin. broad, linear or linear-spathulate, one rather larger and subspathulate, ciliate along the middle part (hairy within, ex *Körnicke*), white, with a black gland near the apex. Male flowers 1–2, central, pedicellate. Sepals 3, lanceolate, more or less connate, subacute, glabrous, membranous, white. Petals minute, unequal, pilose, with a black gland on the inner face. Anthers black. Seeds $\frac{1}{8}$ lin. long, ellipsoid, brown.—Durand & Schinz, Conspect. Fl. Afr. v. 503; Ruhland in Engl. Jahrb. xxvii. 84. *E. pulchellum*, Körnicke in Linnæa, xxvii. 622; Ruhland in Engl. Jahrb. xxvii. 84; Durand & Schinz, Conspect. Fl. Afr. v. 503.

Upper Guinea. Sierra Leone, *Afzelius!*

I cannot, from the description given, distinguish *E. pumilum* from *E. pulchellum*; the only differences assigned are, that the bracts of *E. pumilum* are slightly larger, and the involucral bracts slightly narrower and longer than in *E. pulchellum*, and are acute instead of obtuse. The two supposed species were mixed in Afzelius' Herbarium. I have only seen *E. pulchellum*, a small and very distinct species.

3. **E. xeranthemoides,** *Van Heurck & Müll. Arg. in Van Heurck, Obs. Bot.* 103. Plant small, stemless. Leaves in a radical rosette, 1–1$\frac{1}{3}$ in. long, 1–1$\frac{1}{2}$ lin. broad, flat, linear, tapering to a subobtuse point, many-nerved, glabrous. Peduncles numerous, 1–2 in. long, obtusely 4–5-angled, glabrous, their sheaths 4–6 lin. long, acute, very oblique at

the mouth, rather loose-fitting, glabrous. Heads about 2 lin. in diam., hemispherical, monœcious, with the sexes somewhat intermingled. Involucral bracts much longer than the flowering part of the head, radiating, $1\frac{1}{2}$–$2\frac{1}{4}$ lin. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad, lanceolate, obtuse or subacute, thin, light straw-coloured. Flowering bracts 1 lin. long, $\frac{1}{4}$ lin. broad, oblong-oblanceolate, acute, concave, with a few white hairs on the back or almost glabrous, faintly fuscous-tinted on the apical part. Receptacle densely covered with whitish hairs that are about as long as the flowers. Female flowers pedicellate. Sepals 3, equal, $\frac{2}{3}$ lin. long, scarcely $\frac{1}{8}$ lin. broad, linear, subacute, glabrous, whitish or faintly fuscous-tinted on the apical part. Stipes between the sepals and petals $\frac{1}{4}$ lin. long. Petals 3, unequal, $\frac{1}{2}$–$\frac{3}{4}$ lin. long, about as broad as the sepals, cuneate-linear, subobtuse, whitish, sparingly ciliate and with a few white hairs on the inner face, glandless. Male flowers pedicellate. Sepals more or less united into a narrowly funnel-shaped body $\frac{1}{2}$ lin. long, deeply cleft on one side, denticulate at the apex, fuscous, glabrous. Stipes between the sepals and petals $\frac{1}{4}$–$\frac{1}{3}$ lin. long. Petals obsolete, or one of them represented by a very minute lobule, ciliate with a few hairs. Anthers dark fuscous, not exceeding the calyx. Seeds ellipsoid, about $\frac{1}{6}$ lin. long, very minutely reticulate with microscopic whitish papillæ.—Ruhland in Engl. Jahrb. xxvii. 84.

Upper Guinea. Niger Territory: Borgu; in the drier part of a swampy pond near Fakun, *Barter*, 778!

4. **E. Volkensii,** *Engl. Pfl. Ost-Afr. C.* 133. Dwarf and stemless. Leaves 1–$1\frac{1}{2}$ in. long, 2–4 lin. broad, flat, linear-lanceolate, obtuse or acute, many-nerved, tessellately cross-veined, densely woolly on both sides in the sheathing part, otherwise glabrous. Peduncles shorter than the leaves, 1–$1\frac{1}{4}$ in. long, moderately stout, about $\frac{1}{2}$ lin. thick, 3-angled, thinly pilose at the base, their sheaths about $\frac{1}{4}$ in. long, thin, acute, open nearly to the base, glabrous, embedded in the wool of the leaves. Flower-heads 2–$2\frac{1}{2}$ lin. in diam., subglobose, monœcious, with the outer flowers female. Involucre campanulate, its bracts $1\frac{1}{4}$–$1\frac{1}{3}$ lin. long, 1–$1\frac{1}{4}$ lin. broad, orbicular or subquadrate, very obtuse, glabrous, light straw-coloured. Flowering-bracts $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad, cuneate-obovate, acute, minutely ciliate, straw-coloured or faintly fuscous, very thinly pubescent with white hairs on the apical part. Receptacle glabrous. Female flowers subsessile. Sepals 3, subequal, 1–$1\frac{1}{4}$ lin. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, oblong, obtuse, concave, membranous, whitish, becoming pale fuscous with age, bearded on the apical part with white hairs. Petals 1–$1\frac{1}{4}$ lin. long, $\frac{1}{5}$ lin. broad, linear-lanceolate, acute, white, pubescent on the face, with a black linear gland near the apex; ovary trigonous, glabrous; style deeply trifid.—Ruhland in Engl. Jahrb. xxvii. 82.

Mozamb. Dist. German East Africa: Kilimanjaro, on Kibo peak, 1100 ft., *Volkens*, 2032! on the north side of Kilimanjaro, near the Yumba-ya-Nguaro Cave, *Volkens* (ex *Engler*), in a damp depression near the Noholu Cave, *Volkens*, 2032 (ex *Ruhland*).

5. **E. Thunbergii,** *Wickstr. ex Körnicke in Linnæa*, xxvii. 677. Stemless. Leaves tufted, 6–9½ in. long, 2–3½ lin. broad at the middle, broadly linear, obtuse, flat, 22–25-nerved, glabrous. Peduncles 1–2 to a plant, shorter than the leaves, 5½–6¾ in. long, striate, glabrous, slightly punctulate, their sheaths 3–3¾ in. long, acuminate, at length bifid, lax, pellucid. Heads 3 lin. in diam., semiglobose, white-villous at the summit. Involucral-bracts obovate, rounded at the apex, membranous, glabrous, fuscous, darker towards the apex. Flowering-bracts lanceolate-oblong, acute or acuminate, membranous, fuscous towards the apex or entirely light yellowish, bearded on the apical part. Female flowers shortly pedicellate. Sepals 3, free, oblong, obtuse, boat-shaped, thin and membranous, hyaline-whitish, bearded above and with a crest of hairs at the middle of the back. Petals 3, inserted much higher than the sepals and equalling them, equal, spathulate-linear, obtuse, sparsely hairy within, white, without glands. Male flowers shortly pedicellate. Sepals 3, oblong, very obtuse, connate into a funnel-shaped body open on one side, hyaline, whitish, sparsely bearded on the apical part. Petals equal, small, hairy within, with a black gland below the apex; anthers yellowish.—Durand & Schinz, Conspect. Fl. Afr. v. 503; Ruhland in Engl. Jahrb. xxvii. 81.

Upper Guinea. Sierra Leone, *Afzelius*.

6. **E. bifistulosum,** *Van Heurck & Müll. Arg. in Van Heurck, Obs. Bot.* 105. Aquatic, probably submerged. Stem elongated, usually rather stout, densely leafy in the upper part. Leaves 1–3½ in. long, ⅛–⅓ lin. broad at the base, filiform or almost capillary, tapering to a very fine point, 1-nerved, glabrous. Peduncles numerous, 1½–5 in. long, ¼–½ lin. thick, obscurely 5–6-ribbed, glabrous; their sheaths ¾–1¼ in. long, obtuse or bifid at the apex, glabrous. Heads 1½–2 lin. in diam., depressed-globose, monœcious, fuscous or blackish, often nearly glabrous to the eye. Involucral-bracts ½–⅔ lin. long, ⅓–⅔ lin. broad, obovate-oblong or suborbicular, very obtuse, membranous, varying from light brown to blackish, glabrous. Flowering bracts ⅔–¾ lin. long, ¼ lin. broad, oblong-obovate or oblong, obtuse or subacute, concave, fuscous, with a few minute dusky or whitish hairs on the apical part, or the outer bracts glabrous, perhaps from the hairs being deciduous. Receptacle glabrous. Female flowers conspicuous from their comparatively large size, pedicellate. Sepals 3, free, ½ lin. long, obovate, hooded or very deeply concave, obtuse, enclosing the rest of the flower and forming an inflated balloon-shaped bud, membranous, blackish or fuscous, glabrous. Petals 3, arising close to the sepals, nearly ½ lin. long, ⅛ lin. broad, spathulate-oblanceolate, obtuse, membranous, fuscous, glabrous, with a very minute black gland below the apex. Ovary trigonous; style trifid to nearly half-way down. Male flowers few or numerous, pedicellate. Sepals 3, connate into a funnel-shaped body nearly ½ lin. long, open down one side and obtusely 3–4-lobed at the apex, or one of them free, fuscous or blackish. Stipes between the sepals and petals nearly as long as the sepals. Petals very minute, about ⅛ lin. long,

ovate, acute. Stamens 6; anthers black. Capsule $\frac{1}{3}$ lin. in diam., trigonous. Seeds ellipsoid, obtuse at each end, light brown, nearly smooth, but with an opaque surface.—Durand & Schinz, Conspect. Fl. Afr. v. 502; Ruhland in Engl. Jahrb. xxvii. 75. *E. limosum*, Engl. & Ruhland, and *E. Schweinfurthii*, Engl. & Ruhland in Engl. Jahrb. xxvii. 74.

Upper Guinea. Niger Territory: Nupe; nearly submerged in pools in swamps at Jeba, *Barter*, 1021!

Nile Land. British East Africa: Dar Fertit; in the Biri River, *Schweinfurth*, ser. iii. 244! Jur; at Agada, near Jur Ghattas, *Schweinfurth*, 2476!

After repeated dissection I am quite unable to find any definite character whereby to distinguish *E. bifistulosum* from *E. Schweinfurthii*; the heads of the latter are rather larger and darker than those of *E. bifistulosum*, and the peduncles appear to be stouter in the dried state, but thin transverse sections swollen out in water exhibit no difference in character or size. Such difference as is observable between them I believe to be due to vigour of growth and perhaps some difference in the food supply. The flowering bracts appear to be sometimes entirely glabrous, although usually those in the centre of the heads possess some hairs, which are easily overlooked. The hairs may be very deciduous, or the variation in pubescence and in the length of the peduncles may depend upon the depth of the water in which the plant grows submerged. Schweinfurth's 2476 appears to have grown in shallow water, it is less vigorous than the other specimens and the stem below the leaves is very short or almost wanting in the examples seen, but I cannot find any real structural difference. Sometimes the female flowers are all in the central part of the head and the males outside, in other examples the female flowers are central and the males outside. *E. bifistulosum* and *E. limosum* were both founded upon Barter's 1021.

It is not improbable that *E. bifistulosum*, together with *E. fluitans*, Baker, from Madagascar, should be united with the Brazilian *E. melanocephalum*, Kunth; there is, however, a slight difference in the structure of the peduncles and in the texture of the bracts and sepals. But they require further investigation from a larger series of specimens than is at my command before a correct decision can be made. From the Indian *E. setaceum*, Linn. (which it closely resembles in general appearance) the glabrous petals of *E. bifistulosum* readily distinguish it. The Australian plant named *E. setaceum* by Bentham is quite different in floral structure from all the species above mentioned.

7. **E. submersum,** *Welw. ex Rendle in Cat. Afr. Pl. Welw.* ii. 100, *not of Tate.* Plant submerged in water 2–3 ft. deep, flowering and fruiting under water. Leaves very numerous, densely rosulate, 2–4 in. long, not exceeding $\frac{1}{3}$ lin. in greatest breadth, linear-filiform, vivid green, soon becoming very flaccid when taken out of water. Peduncles usually numerous in adult plants, 6–13 in. long, $\frac{1}{4}$ to rather more than $\frac{1}{3}$ lin. thick, terete, 5–7-ribbed, glabrous; their sheaths $1\frac{3}{4}$–$2\frac{1}{4}$ in. long, oblique at the mouth, often bifid or trifid at the membranous apex, glabrous. Heads $2\frac{1}{2}$–$3\frac{1}{2}$ lin. in diam., depressed-globose, black, monœcious, with the male and female flowers mixed. Involucral-bracts $\frac{5}{6}$–$1\frac{1}{4}$ lin. long, $\frac{1}{2}$–$\frac{2}{3}$ lin. broad, oblong-obovate, obtuse, membranous, blackish, glabrous. Flowering-bracts 1–$1\frac{1}{4}$ lin. long, $\frac{1}{3}$ to nearly $\frac{1}{2}$ lin. broad, oblanceolate or spathulate-oblanceolate, acute, or the outer obtuse, membranous, glabrous, blackish. Receptacle slightly hairy (ex *Rendle*). Female flowers shortly pedicellate. Sepals 3, slightly

unequal, $\frac{5}{6}$–1 lin. long, oblanceolate, acute, boat-shaped, slightly keeled, membranous, blackish, with a few minute white hairs on the upper part. Petals 3, arising close to the sepals, about 1 lin. long, narrowly linear, tapering towards the base, membranous, ciliate at the obtuse apex with a few very short hairs, without glands on the face, fuscous. Male flowers shortly pedicellate. Sepals 3, free or variously connate below, $\frac{2}{3}$ lin. long, $\frac{1}{10}$–$\frac{1}{8}$ lin. broad, linear, obtuse or irregularly denticulate at the apex, glabrous or with a few minute white hairs, fuscous. Stipes between the sepals and petals about $\frac{1}{2}$ lin. long. Petals minute or rudimentary. Anthers black. Seeds light brown, striolate.

Lower Guinea. Angola: Huilla, 3800–5500 ft.; in stagnant places near the banks of the River Mupanda, *Welwitsch*, 2456! in the mud of slowly flowing streams between Humpata and Lopollo, and between Lopollo and Nene, *Welwitsch*, 2457!

Allied to *E. bifistulosum*, Van Heurck, but differing in having acute sepals to the female flowers, with a few minute white hairs on the keel. The name of this species antedates by 7 months the *E. submersum*, Tate, of South Australia.

8. **E. Mannii,** *N. E. Br.* Stem or rhizome elongating, rooting, $\frac{1}{2}$–$\frac{3}{4}$ lin. thick. Leaves not very numerous, in a lax rosette, erect or ascending, 1–$2\frac{1}{2}$ in. long, $\frac{1}{3}$–$\frac{3}{4}$ lin. broad, linear, subacute, 4–6-nerved, glabrous. Peduncles 1–3 to a plant, $2\frac{1}{2}$–6 in. long, 6-ribbed, slender, glabrous, their sheaths $\frac{3}{4}$–$1\frac{1}{4}$ in. long, subacute, glabrous. Heads 2–$2\frac{1}{2}$ lin. in diam., globose, monœcious, whitish-brown. Involucral-bracts $\frac{3}{4}$–1 lin. long, $\frac{1}{2}$–$\frac{2}{3}$ lin. broad, oblong, obtuse, glabrous, very slightly ciliate, submembranous, light ochreous-brown. Flowering-bracts $\frac{3}{4}$ lin. long, $\frac{1}{3}$ lin. broad, cuneate-oblong, obtuse or somewhat acute, rather membranous, slightly ciliate and very slightly pubescent on the back, very light ochreous. Receptacle glabrous. Female flowers in a few exterior series, shortly pedicellate. Sepals 3, equal, $\frac{2}{3}$ lin. long, $\frac{1}{4}$ lin. broad, oblong, obtuse and often denticulate at the apex, very membranous, white, glabrous. Petals 3, equal, $\frac{3}{4}$ lin. long, $\frac{1}{5}$ lin. broad, cuneately linear-oblong, obtuse, very hairy on the inner face, ciliate, white, with a black gland near the apex. Male flowers very numerous, central, pedicellate. Sepals free, $\frac{1}{2}$ lin. long, $\frac{1}{4}$ lin. broad, cuneate-oblong, obtuse, membranous, slightly ciliate and sometimes toothed at the apex. Stipes between the sepals and petals $\frac{1}{4}$–$\frac{1}{3}$ lin. long. Petals unequal, white, densely bearded on the apical half of the inner side, with a black gland slightly above the middle, the largest $\frac{1}{2}$ lin. long, $\frac{1}{4}$ lin. broad, cuneate-obovate, obtuse. Anthers black. Seeds $\frac{1}{4}$ lin. long, broadly ellipsoid, very obtuse at the ends, yellowish-brown, nearly smooth.

Lower Guinea. Gaboon: Sierra del Crystal, *Mann*, 1689!

9. **E. stoloniferum,** *Welw. ex Rendle in Cat. Afr. Pl. Welw.* ii. 101. A stemless, stoloniferous perennial, entirely submerged, with the flower-heads just emerging when mature. Leaves 5–9 in. long, $\frac{1}{2}$–$1\frac{1}{4}$ lin. broad, linear, tapering to a fine point, very bright shining green. Peduncles solitary or few, 8–16 in. long, $\frac{3}{4}$ lin. thick, 7–8-ribbed, their sheaths

$2\frac{1}{2}$–$3\frac{1}{3}$ in. long, loose, obtusely bifid at the apex, glabrous. Heads 3–4 lin. in diam., depressed-globose, monœcious, often viviparous, the flowering part fuscous. Involucral-bracts $1\frac{1}{2}$–$1\frac{2}{3}$ lin. long, $\frac{3}{4}$–$1\frac{1}{2}$ lin. broad, orbicular or broadly obovate, very obtuse, glabrous, submembranous, whitish or whitish-brown. Flowering-bracts $1\frac{1}{2}$ lin. long, $\frac{1}{2}$ lin. or less broad, oblanceolate or subspathulate, acute or subacute, glabrous, thin, incurved, fuscous in the lower part, whitish in the apical part, or some of them fuscous above the middle, with the basal half and just the apex whitish. Receptacle glabrous. Female flowers shortly pedicellate. Sepals 3, more or less unequal, about 1 lin. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, obovate or more or less boat-shaped, obtuse or irregularly denticulate at the apex, dark fuscous, with a very few scattered hairs on the back (not quite glabrous, as originally described). Petals 3, arising close to the sepals, $\frac{3}{4}$–1 lin. long, $\frac{1}{5}$–$\frac{1}{3}$ lin. broad, cuneate-linear or cuneate-oblong, obtuse, white, bearded on the apical part of the inner surface with white hairs, and with a black gland just below the apex. Male flowers pedicellate. Sepals 3, free or more or less combined, about 1 lin. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, cuneate or cuneate-oblong, obtuse or denticulate at the apex, glabrous in some flowers, and with a few white hairs on the back in others, dark fuscous. Stipes between the sepals and petals $\frac{1}{4}$–$\frac{1}{2}$ lin. long. Petals $\frac{1}{4}$–$\frac{1}{2}$ lin. long, oblong, whitish, bearded with white hairs on the inner face at the apex and with black linear subapical glands. Anthers white (not dark, as originally described).

Lower Guinea. Angola: Huilla; in the cold rapid mountain streams of Morro de Lopollo, 3800–5800 ft., *Welwitsch*, 2458!

According to the notes with Welwitsch's specimen, this plant forms a green carpet on the beds of the streams under the water, and rarely flowers, the heads being frequently viviparous, when their peduncles bend down and produce young plants, forming the so-called stolons. It is allied to *E. Woodii*, N. E. Br., from Natal.

10. **E. Antunesii,** *Engl. & Ruhland in Engl. Jahrb.* xxvii. 76. Leaves 2 in. long, $\frac{3}{4}$ lin. broad, linear, acute, 3–5-nerved, glabrous. Flowering peduncle solitary, viviparous peduncles clustered, up to $7\frac{1}{2}$ in. long, $\frac{1}{2}$ lin. thick, with sheaths rather longer than the leaves, glabrous. Heads $4\frac{1}{2}$–5 lin. in diam., globose, villous, grey. Involucral-bracts nearly orbicular, glabrous, whitish, shining. Flowering-bracts $1\frac{1}{3}$–$1\frac{1}{2}$ lin. long, $\frac{1}{3}$ lin. broad, linear-oblong or lanceolate, acute, fuscous, slightly hairy on the back. Female flowers external. Sepals 3, subequal, 1 lin. long, $\frac{1}{3}$ lin. broad, deeply boat-shaped, with a rather large marginal tooth on one or both sides below the acuminate apex, blackish, sparsely furnished with white hairs. Petals 3, equal, 1 lin. long, $\frac{1}{4}$ lin. broad, linear-oblong, cuneate towards the base, obtuse, white, with a black gland near the apex, ciliate and slightly bearded on the inner face at the apex only. Male flowers pedicellate. Sepals 3, free, $\frac{2}{3}$–1 lin. long, $\frac{1}{5}$–$\frac{1}{3}$ lin. broad, one of them narrower than the others, cuneate-obovate, truncate and minutely denticulate at the apex, blackish, sparsely ciliate and with here and there a hair on the back. Petals unequal, $\frac{1}{4}$–$\frac{1}{2}$ lin.

long, $\frac{1}{8}$–$\frac{1}{4}$ lin. broad, white, ciliate and bearded on the inner face with white hairs, and with a black gland near the apex. Anthers white.

Lower Guinea. Angola: Huilla, *Antunes*, 139!

11. **E. latifolium,** *Smith in Rees, Cyclop.* xiii. Stemless. Leaves all radical, 2–8 or more in. long, 1–4 lin. broad, linear, subacute or somewhat obtuse, flat, thin, many-nerved, glabrous. Peduncles 1–6 to a plant, 5–12 in. long, $\frac{2}{3}$–1 lin. thick, 7-ribbed, glabrous, their basal sheaths 2–4 in. long, oblique at the mouth, acute, glabrous. Heads monœcious, with the male flowers in the centre, 3–4 lin. in diam., hemispherical or subglobose, white-villous. Involucral-bracts in 4–5 series, glabrous, entire, light brown; innermost 1–1$\frac{1}{4}$ lin. long, $\frac{1}{2}$ lin. broad, obovate-oblong, obtuse; outermost orbicular often broader than long. Flowering-bracts about 1 lin. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, linear-oblanceolate or cuneate-oblong, acute, light brownish or fuscous, densely bearded with white hairs on the apical part. Receptacle glabrous. Female flowers very numerous, pedicellate. Sepals 3, subequal, $\frac{3}{4}$–1 lin. long, $\frac{1}{6}$–$\frac{1}{4}$ lin. broad, oblong or cuneate-oblong, boat-shaped, obtuse, very pale brownish-white, hyaline, bearded with long white hairs on the apical part. Petals arising slightly above the sepals, $\frac{3}{4}$ lin. long, very narrow, linear, obtuse, whitish, hyaline, rather densely bearded with long white hairs, glandless or one of them with a very minute black gland at the apex. Ovary trigonous; style trifid to $\frac{2}{3}$ the way down. Male flowers pedicellate. Sepals 3, free, $\frac{1}{2}$ lin. long, linear, obtuse, whitish, densely bearded with white hairs. Stipes between the sepals and petals $\frac{1}{4}$ lin. long. Petals $\frac{1}{4}$ lin. long or less, oblong, obtuse, whitish, densely fringed with white hairs, and with a black gland just below the apex. Anthers white. Capsule $\frac{1}{3}$ lin. in diam. Seeds ellipsoid, apiculate, brown.—Britten in Journ. Bot. 1900, 482. *E. rivulare*, G. Don ex Benth. in Hook. Niger Fl. 547; Koernicke in Linnæa, xxvii. 666; Durand & Schinz, Conspect. Fl. Afr. v. 503; Ruhland in Engl. Jahrb. xxvii. 75.

Upper Guinea. Sierra Leone: in a rivulet near Vatemba Road, *Barter!* in a rivulet near Freetown, *Don!* and without precise locality, *Vogel!*

In the original description the sepals of the male flowers are stated to be connate into a 3-lobed tube, but in all the flowers I have dissected they are free.

12. **E. Schimperi,** *Koernicke ex Engl. Hochgebirgsfl. Trop. Afr.* 154. A robust stemless plant. Leaves in a radical rosette, numerous, 3$\frac{1}{2}$–7 in. long, 3–5 lin. broad, flat, broadly linear, obtuse and slightly thickened at the apex, many-nerved, glabrous. Peduncles 1–3 to a plant in the specimens seen, 7–14 in. long, $\frac{2}{3}$–$\frac{3}{4}$ lin. thick, about 8-ribbed, glabrous; their basal sheaths 3$\frac{1}{2}$–4 in. long, loose, somewhat obtuse, with a very oblique mouth, glabrous. Flower-heads 4–5 lin. in diam., globose, monœcious, with the outer flowers female. Involucral-bracts in 2–3 series, 1$\frac{1}{2}$ lin. long, $\frac{3}{4}$–1 lin. broad, oblong or somewhat obovate-oblong, acute, glabrous, light fuscous, the innermost subtending the female flowers. Flowering-bracts 1$\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad, somewhat

spathulate-obovate, concave, obtusely keeled on the back, pale fuscous, densely bearded with white hairs on the apical part. Receptacle glabrous. Female flowers subsessile or very shortly pedicellate, trigonous. Sepals 3, equal, 1–1¼ lin. long, ½ lin. broad, elliptic-oblong, very deeply boat-shaped, obtuse, obtusely keeled, dark fuscous, bearded with white hairs at the apex. Petals 3, one larger than the others, arising close to the sepals, about 1¼ lin. long, ¼–⅓ lin. broad, oblanceolate, acute, white, bearded with white hairs within and with a black gland near the apex. Male flowers pedicellate. Sepals 1 lin. long, ⅓–½ lin. broad, free or variously connate, obovate, obtuse, dark fuscous, bearded with white hairs at the apex. Stipes between the sepals and petals about ½ lin. long. Petals unequal, oblong, acute, white, bearded with white hairs within and with a black linear central gland, the largest ¾ lin. long, ¼ lin. broad. Anthers black. Capsule 3-lobed, ½ lin. in diam., glabrous, brown. Seeds ⅓ lin. long, ellipsoid, brown.—Ruhland in Engl. Jahrb. xxvii. 80. *E. schimperianum*, Koernicke in Schweinf. Beitr. Fl. Aethiop. 309, name only; Durand & Schinz, Conspect. Fl. Afr. v. 503.

Nile Land. Abyssinia: Begemeder; in a swamp at Jan Meda, 8500 ft., *Schimper*, 1217!

13. **E. mesanthemoides,** *Ruhland in Engl. Jahrb.* xxvii. 79. Leaves erect, 3½–10 in. long, (1⅓ in. broad at the base, ex *Ruhland*), ½ in. broad in the specimen seen, but much dilated in the sheathing portion, gradually tapering to a very obtuse apex, many-nerved, glabrous. Peduncles several to a plant (3 in the specimen seen), much longer than the leaves, 1–1¼ lin. thick, terete, with 10–11 remarkably prominent ribs, as seen in thin transverse section in water, glabrous; their sheaths shorter than the leaves, very lax, mostly 3-fid at the apex, glabrous. Heads about 6–7 lin. in diam., semiglobose, monœcious, densely white-pubescent (somewhat glabrous, ex *Ruhland*). Involucral-bracts 1¾–2½ lin. long, 1–1⅓ lin. broad, white (greenish-fuscous, ex *Ruhland*), glabrous. Flowering-bracts 1¾–2 lin. long, ¾–1 lin. broad, cuneate-rhomboid, abruptly very acute, white, densely bearded with short white hairs on the apical part. Female flowers shortly pedicellate. Sepals 3, equal, 1⅓ lin. long, ⅓ lin. broad, oblong, boat-shaped, flaccid, blackish, bearded and ciliate with white hairs on the apical part. Petals 3, unequal, 1–1⅓ lin. long, ¼ lin. broad, linear-subspathulate (oblong-spathulate, ex *Ruhland*), white, all slightly hairy on the inner face (ciliate, ex *Ruhland*) with a black gland near the apex, the larger bearded on the back at the apex, the smaller with only a small apical tuft of white hairs. Male flowers pedicellate. Sepals connate into a funnel-shaped body about 1¼ lin. long, open down one side, trifid at the apex, blackish, densely bearded with white hairs on the apical part. Stipes between the sepals and petals exceedingly short, about ⅛ lin. or less long. Petals 3, unequal, ⅔–1 lin. long, ⅛–⅕ lin. broad, linear-cuneate, whitish, densely bearded with white hairs on the apical part, and with

a linear black gland near the apex. Anthers black.—Engl. Jahrb. xxviii. 356.

Mozamb. Dist. German East Africa: Ukami; on the Lukwangula Plateau in the Uluguru district, *Stuhlmann*, 9143, *Goetze*, 293!

In the very imperfect description given by Ruhland the flower-heads are described as somewhat glabrous (glabriusculis), and the involucral-bracts as greenish-fuscous. I have not seen Stuhlmann's 9143, but in the plant collected by Goetze (from which I have made the above description), the heads are densely white-pubescent, and the involucral-bracts white. The numerous, narrow, very prominent ribs on the peduncle are quite different from those of any other African species I have examined.

14. **E. decipiens,** *N. E. Br.* Stemless, moderately robust, with stout roots. Leaves numerous, 3–4 in. long, 2–3 lin. broad, flat gradually tapering from the base to a very acute point, many-nerved, with the tessellate cross-veins very distinct in the basal part in the dried state, woolly in the sheathing part, otherwise glabrous. Peduncle solitary, twice as long as the leaves, 6-ribbed, glabrous; sheath $3\frac{1}{2}$ in. long, shortly oblique at the acute apex, glabrous. Heads $4\frac{1}{2}$ lin. in diam., hemispherical, unisexual in the 6 examples seen. Involucral-bracts about 2 lin. long, 1 lin. broad, obovate, acute, whitish, glabrous. Flowering-bracts $1\frac{3}{4}$–2 lin. long, $\frac{2}{3}$–$\frac{3}{4}$ lin. broad, cuneate-obovate, acute, concave, much incurved at the apex, very light straw-colour or faintly greenish-white, bearded with white hairs on the apical part. Receptacle pilose. Female flowers not seen. Male flowers pedicellate. Sepals 3, nearly equal, more or less connate at the base, 1–$1\frac{1}{4}$ lin. long, $\frac{1}{4}$–$\frac{1}{2}$ lin. broad, obovate-oblong, obtuse, concave, entirely fuscous, bearded with white hairs at the apex. Petals separated from the sepals by a stipes of variable length, unequal, the largest $\frac{3}{4}$–$1\frac{1}{4}$ lin. long, oblong, oblanceolate or linear, and sometimes scarcely broader than the gland, white, densely bearded with white hairs, and with a linear black gland at the middle. Anthers black.—*E. sonderianum.* Rendle in Trans. Linn. Soc. ser. 2, iv. 53; Engl. Pfl. Ost-Afr. C. 133; Ruhland in Engl. Jahrb. xxvii. 81, partly, not of Koernicke.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Mlanji, *Whyte*, 115!

This plant is so exceedingly like *E. sonderianum*, Koernicke, in external appearance as to have been mistaken for it, but it distinctly differs in the following particulars:—The flowering-bracts are much longer, broader, without the fuscous spot on each side of the less pronounced keel, and are less rigid and more membranous; the sepals of the male flowers are larger, much more membranous, not keeled, and are fuscous quite to the apex, whilst in *E. sonderianum* the apical part of the sepals of the male flowers is white with a whitish mid-line line running halfway down the keel. Other differences may, perhaps, be found in the female flowers when known. From *E. Dregei*, Hochst, it differs in its very acute leaves, and much shorter cilia on the sepals, &c.

15. **E. lacteum,** *Rendle in Cat. Afr. Pl. Welw.* ii. 99. Stemless, tufted. Leaves numerous, $\frac{3}{4}$–$1\frac{3}{4}$ in. long, $\frac{1}{2}$–$1\frac{2}{3}$ lin. broad, densely

rosulate, linear, obtuse and somewhat hardened at the apex, glabrous. Peduncles varying from 1–10 to a plant, 3–18 in. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. thick, terete, 6–8-ribbed, their sheaths $1\frac{1}{3}$–$2\frac{1}{2}$ in. long, bifid or much split at the apex, striate, glabrous. Heads 3–$4\frac{1}{2}$ lin. in diam., depressed-globose, milk-white, unisexual or monœcious, the smaller male, the larger with numerous male flowers surrounding a few females, or the sexes intermixed? Involucral-bracts $1\frac{1}{4}$–$1\frac{3}{4}$ lin. long, $\frac{2}{3}$–$\frac{3}{4}$ lin. broad, broadly oblanceolate, obtusely pointed, glabrous, straw-coloured or ochreous, often fuscous at the apex. Flowering-bracts 1–$1\frac{1}{2}$ lin. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad, spathulate- or cuneate-obovate, variably acute or acuminate, incurved, straw-coloured below, blackish or fuscous on the apical part, or sometimes entirely pale ochreous, pubescent with white hairs on the back, below the apex. Receptacle pilose. Female flowers subsessile. Sepals 3, equal, $\frac{2}{3}$–1 lin. long, about $\frac{1}{4}$ lin. broad, cuneate-oblong, obtuse, two of them concave, slightly hooded at the apex, the third flattened, whitish, slightly fuscous at the apex, bearded on the apical part with short white hairs. Petals 3, unequal, arising slightly above the sepals, the largest 1–$1\frac{1}{4}$ lin. long, $\frac{1}{4}$ lin. broad, the others about $\frac{3}{4}$ lin. long, $\frac{1}{6}$ lin. broad, cuneate-oblanceolate, obtuse, white, with a black gland below the apex, and bearded on the inner face with white hairs; style deeply trifid. Male flowers shortly pedicellate. Sepals 3, equal, free, exactly as in the female flowers. Stipes between the sepals and petals very variable, $\frac{1}{8}$–$\frac{3}{4}$ lin. long. Petals 3, very unequal; the largest $\frac{1}{3}$–$1\frac{1}{4}$ lin. long, $\frac{1}{5}$–$\frac{1}{2}$ lin. broad, cuneate-oblong, obtuse, the lateral $\frac{1}{3}$–$\frac{3}{4}$ lin. long, sometimes rudimentary, spathulate or narrowly linear, all white, densely bearded with white hairs at the apex and on the apical part of the inner face, with a black gland at the middle. Anthers black.

Lower Guinea. Angola: Huilla; frequent in swampy meadows around Lopollo, *Welwitsch*, 2452! in somewhat spongy meadows on the highest parts of Morro de Lopollo, *Welwitsch*, 2452B! on the high spongy slopes of Serra de Oiahoia, in the Humpata district, *Welwitsch*, 2453! near Cunene River, *Johnston!*

Mozamb. Dist. German East Africa: lower plateau, north of Lake Nyasa, *Thomson!* British Central Africa: Mashonaland, *Bryce!*

E. lacteum may prove to be conspecific with *E. Teusczii*, Engl. & Ruhl., but the description of the latter does not enable me to identify it.

16. **E. bongense,** *Engl. & Ruhland in Engl. Jahrb.* xxvii. 75. Stemless. Leaves erect or ascending, $1\frac{1}{2}$–3 in. long, 1–2 lin. broad, linear, somewhat abruptly acute or subobtuse, many-nerved, glabrous. Peduncles 5–16 to a plant, 3–12 (usually more than 6) in. long, terete, 6–7-ribbed in the dried state, glabrous, their sheaths $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, acute, rather loose, glabrous. Heads $2\frac{1}{2}$–4 lin. in diam., at first subglobose, becoming somewhat ovoid, monœcious, with the sexes intermixed, light straw-coloured, slightly shining. Involucral-bracts $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, $\frac{3}{4}$–$1\frac{1}{4}$ lin. broad, obovate or obovate-oblong, obtuse, apiculate or subacute, concave, somewhat membranous at the margins, light straw-coloured, glabrous. Flowering bracts $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, $\frac{1}{3}$ lin. broad, cuneate-oblong or narrowly oblanceolate, acuminate or cuspidate-acute, incurved, thin, scarious, very light straw-coloured, glabrous.

Receptacle ovoid or conical, pilose with long silky hairs, which also occur at the base of the pedicels. Female flowers very numerous, pedicellate. Sepals 3, free, equal or unequal, $\frac{3}{4}$–$1\frac{1}{4}$ lin. long, about $\frac{1}{12}$ lin. broad, linear-filiform, acute, faintly tinted with straw-colour, glabrous. Petals 3, shortly distant from the sepals, unequal, $\frac{3}{4}$–$1\frac{1}{4}$ lin. long, $\frac{1}{12}$–$\frac{1}{8}$ lin. broad, linear, obtuse, white, hyaline, glabrous on both sides, ciliate at the apex, without glands. Ovary trigonous; style trifid to half-way down. Male flowers pedicellate. Sepals 3, free, $\frac{1}{2}$–$\frac{5}{6}$ lin. long, $\frac{1}{12}$–$\frac{1}{8}$ lin. broad, linear, acute, glabrous, hyaline, faintly tinged with fuscous or straw-colour. Stipes between the sepals and petals $\frac{1}{2}$ lin. long. Petals rudimentary, represented by 1–3 minute tufts of hairs. Anthers black. Capsule $\frac{1}{4}$ lin. in diam. Seeds ellipsoid, brown, reticulate with very minute white papillæ.

Upper Guinea. Niger Territory; Nupe, *Barter*, 1019A!

Nile Land. British East Africa: Jur; at Agada (River ?) near Jur Ghattas, *Schweinfurth*, 2539! Bongo; at Balu stream, near Sabbi, *Schweinfurth*, 2722!

17. **E. Buchananii,** *Ruhland in Engl. Jahrb.* xxvii. 83. Stemless. Leaves in a radical rosette, $\frac{1}{2}$–$1\frac{1}{3}$ in. long, 1–$2\frac{3}{4}$ lin. broad, flat, linear, acute or subobtuse, often slightly thickened at the apex, 5–11-nerved, tessellately cross-veined, glabrous. Peduncles very numerous, 3–7 in. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. thick, 4–5-striate and twisted in the dried state, square or terete when swollen in water, glabrous, their sheaths $\frac{2}{3}$–$1\frac{1}{4}$ in. long, acute, entire, glabrous. Heads exactly globular, monœcious, $1\frac{1}{2}$–$2\frac{1}{4}$ lin. in diam., blackish or dark brown. Involucral-bracts at length reflexed, 1 lin. long, $\frac{2}{3}$–$\frac{3}{4}$ lin. broad, oblong-obovate, obtuse, glabrous. Flowering-bracts 1 lin. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad, spathulate-obovate, acute, concave, blackish or fuscous, glabrous or very thinly pubescent with whitish hairs. Receptacle pilose. Female flowers very numerous, in many series, pedicellate. Sepals 3, unequal, blackish or brown, glabrous, two lateral $\frac{2}{3}$ lin. long, deeply concave, gibbous-keeled, obtuse, the third (ventral) $\frac{1}{2}$ lin. long, $\frac{1}{8}$–$\frac{1}{6}$ lin. broad, lanceolate, acute. Petals slightly unequal, $\frac{1}{2}$–$\frac{3}{4}$ lin. long, $\frac{1}{8}$–$\frac{1}{6}$ lin. broad, oblanceolate or linear-oblanceolate, obtuse, dark fuscous, rarely pallid, glabrous, glandless. Male flowers comparatively few, central, pedicellate. Sepals 3, more or less united into a funnel-shaped body open down one side, 3-crenate at the apex, $\frac{1}{2}$ lin. long, blackish, rarely pallid, glabrous. Petals separated from the sepals by a stipes $\frac{1}{3}$ lin. long, very unequal, two very rudimentary or altogether wanting, the third $\frac{1}{4}$ lin. long, oblong, obtuse, whitish, not exceeding the stamens, glabrous, glandless. Anthers black. Seeds $\frac{1}{3}$ lin. long, ellipsoid, covered with very minute white papillæ arranged in transverse rows.

Mozamb. Dist. British Central Africa: Nyasaland; on the Tanganyika Plateau at Fort Hill, 3800–4000 ft., *Whyte!* Shibisa (Chikwawa) to Tshimuze, 2000–4000 ft., *Kirk!* at the foot of Mount Sochi, 3000 ft., *Kirk!* Namasi, *Cameron*, 50! and without precise locality, *Buchanan*, 1168!

18. **E. andongense,** *Welw. ex Rendle in Cat. Afr. Pl. Welw.* ii. 100. Stemless, somewhat fleshy, subglaucous-green, becoming yellowish-

green when older. Leaves numerous, $\frac{2}{3}$–2 in. long, $\frac{1}{2}$–$1\frac{1}{2}$ lin. broad, linear, obtusely pointed and slightly hardened at the apex, erectly spreading, glabrous. Peduncles 5–8 in. long, about $\frac{1}{5}$ lin. thick, subfiliform, terete, about 6-striate in the dried state, glabrous; their sheaths slightly shorter than the leaves, oblique at the mouth, subacute. Heads $1\frac{1}{2}$–2 lin. thick, subglobose, somewhat truncate at the base, dark fuscous or blackish, monœcious, with the outer flowers female. Involucral-bracts 1 lin. long, $\frac{1}{2}$ lin. broad, oblong, obtuse or subacute, glabrous, straw-coloured, shining. Flowering-bracts 1 lin. or slightly more long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, oblanceolate, very acute, incurved, glabrous, fuscous, with a few of the outermost straw-coloured. Receptacle pilose. Female flowers shortly pedicellate. Sepals 3, unequal, fuscous, glabrous; the 2 lateral $\frac{3}{4}$ lin. long, $\frac{1}{6}$–$\frac{1}{4}$ lin. broad, obliquely spathulate-obovate, nearly straight on the inner margins, very gibbous-keeled on the back, very acute or almost awned at the apex, deeply concave, or somewhat hooded; third sepal slightly shorter, about $\frac{1}{8}$ lin. broad, linear-oblanceolate, acute, nearly flat. Petals 3, unequal, arising about $\frac{1}{8}$ lin. above the sepals, fuscous, glabrous, the largest petal about $\frac{3}{4}$ lin. long, $\frac{1}{8}$ lin. broad, linear-lanceolate, acute or bifid, the others shorter, linear-cuneate, bifid or irregularly crenulate at the apex. Male flowers pedicellate. Sepals 3, free, oblanceolate, obtuse, or more or less united into a funnel-shaped body open down one side, glabrous, fuscous. Petals rudimentary. Anthers black. Seeds ellipsoid, striolate.

Lower Guinea. Angola: Pungo Andongo, 2400–3800 ft.; in the Præsidium, in spongy places on the higher rocks of Pedra de Cazamba, *Welwitsch*, 2442! in spongy rocky places by the springs on the gigantic rocks of the Præsidium, at Fonte de Salgado, *Welwitsch*, 2443! in wet places by the Cataract of Condo (de Estefania), *Welwitsch*, 2443B!

This is very similar to *E. Buchananii*, Ruhland, but the heads are not so globose, being more or less flattened at the base, and the sepals of the female flowers have a rather long acutely acuminate point, whilst in *E. Buchananii* the point of the sepals is very short and never very acute.

19. **E. fulvum,** *N. E. Br.* Stemless. Leaves numerous, in a radical rosette, $1\frac{1}{4}$–2 in. long, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. broad, linear, tapering to an obtuse point, flat, many-nerved, glabrous. Peduncles numerous, $2\frac{1}{2}$–4 in. long, subterete, 5-striate in the dried state, glabrous, their sheaths about 1 in. long, acute, rather loose, glabrous. Heads not quite 2 lin. in diam., semiglobose, perhaps globose with age, monœcious, buff-coloured, glabrous. Involucral-bracts not quite 1 lin. long, $\frac{3}{4}$ lin. broad at the apex, obovate, very obtuse, concave at the apex, spreading. Flowering-bracts like the involucral-bracts, but rather smaller, all buff-coloured, glabrous. Receptacle pilose. Female flowers in several exterior series, very shortly pedicellate. Sepals 3, very unequal, $\frac{1}{2}$ lin. long, buff-coloured, glabrous; two lateral obliquely obtriangular, tapering towards the base, deeply hooded, somewhat gibbous-keeled and about $\frac{1}{4}$ lin. broad near the apex; ventral sepal about $\frac{1}{10}$ lin. broad, linear, obtuse, rather membranous. Petals unequal, one about $\frac{1}{2}$ lin. long, $\frac{1}{5}$ lin. broad, cuneate-oblanceolate, notched at the apex, the other two

similar, but smaller, all yellowish-white, glabrous, glandless. Male flowers numerous, central, shortly pedicellate, quite glabrous. Sepals $\frac{1}{2}$ lin. long, united into a funnel-shaped body open down one side, shortly 3-lobed, submembranous, buff-coloured. Petals very unequal, 2 rudimentary, 1 about $\frac{1}{8}$ lin. long, ovate, obtuse. Anthers black.

Upper Guinea. Niger Territory; Nupe, *Barter!*

A very distinct species, easily recognised by its slightly glossy, buff-coloured heads.

20. **E. Welwitschii,** *Rendle in Cat. Afr. Pl. Welw.* ii. 97. Stemless. Leaves $\frac{1}{2}$–$1\frac{1}{3}$ in. long, about $\frac{1}{3}$–$\frac{1}{2}$ lin. broad at the base, filiform-subulate, gradually tapering to a very fine point, glabrous. Peduncles numerous, $1\frac{1}{2}$–4 in. long, about $\frac{1}{5}$ lin. thick, filiform, glabrous, their sheaths 4-8 lin. long, oblique at the mouth, bifid at the apex. Heads 1–$1\frac{1}{2}$ lin. in diam., subglobose, somewhat flattened at the base, slightly echinulate from the bracts exceeding the flowers, monœcious, with the outer flowers female. Involucral- and flowering-bracts lanceolate, acute or acuminate, membranous, whitish or faintly straw-coloured, glabrous, those of the involucre $\frac{3}{4}$ lin. long, $\frac{1}{4}$ lin. broad, the others rather shorter. Receptacle pilose. Female flowers sessile. Sepals 3, subequal, $\frac{1}{3}$ lin. long, $\frac{1}{10}$–$\frac{1}{8}$ lin. broad, linear-lanceolate, very acute, concave, membranous, whitish, glabrous. Petals 3, arising close to the sepals, about $\frac{1}{3}$ lin. long, filiform, glabrous. Male flowers subsessile. Sepals 3, about $\frac{1}{3}$ lin. long, $\frac{1}{12}$–$\frac{1}{10}$ lin. broad, linear-lanceolate, acute, free or more or less connate below, membranous, whitish. Petals rudimentary. Anthers black.—*Dichrolepis pusilla,* Welw. Apont. 542.

Lower Guinea. Angola: Pungo Andongo; only seen in one place, between Lombe and Candumba, between 2400 and 3800 ft., *Welwitsch,* 2441!

Var. *pygmæum,* Rendle in Cat. Afr. Pl. Welw. ii. 98. A dwarf congested form, 8–15 lin. high. Heads somewhat fuscous, with a whitish involucre. Receptacle almost glabrous.

Lower Guinea. Angola: Huilla; near Lopollo, in fields where Sorghum had been cultivated the previous year, *Welwitsch,* 2444!

21. **E. Teusczii,** *Engl. & Ruhland in Engl. Jahrb.* xxvii. 77. Leaves in a radical rosette, $1\frac{1}{2}$–2 in. long, $1\frac{1}{2}$–2 lin. broad, lanceolate-linear, obtuse and slightly thickened at the apex, 11–12-nerved, reddish, glabrous. Peduncles up to 2 ft. long, 10–12 times as long as the leaves, 3–4 to a plant, with sheaths nearly twice as long as the leaves, split into 3–4 at the mouth, glabrous. Heads large, globose, hard, shortly villous. Involucral-bracts nearly rhomboid, rounded at the apex, somewhat glabrous, whitish-brown. Flowering-bracts obovate, subacute. Receptacle apparently glabrous. Female flowers: Sepals 3, equal, narrowly ovate, hairy at the apex, white. Petals 3, elongate-spathulate, ciliate all round, with a gland near the apex. Male flowers: Sepals 3, almost free to the base, equal, obovate, obtuse, ciliate, white. Petals equal, ciliate, with a gland near the apex. Anthers black.

Lower Guinea. Angola: Malange, *Mechow,* 231.

Said to be allied to *E. huillense*, Engl. & Ruhland, but differing in its larger leaves and heads, pure white sepals, longer female petals and narrow equal male petals. I have not seen it. See note under *E. lacteum*, Rendle, p. 246.

22. **E. huillense,** *Engl. & Ruhland in Engl. Jahrb.* xxvii. 78; *not of Rendle.* Leaves short, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, at the base 2 lin. broad, above $\frac{1}{3}$–$\frac{1}{2}$ lin. broad, lanceolate, obtuse and somewhat thickened at the apex, about 9–11-nerved, glabrous. Peduncles 2–3 to a plant, several-ribbed; their sheaths twice as long as the leaves, glabrous. Heads white-villous at the summit. Involucral-bracts ovate, subacute, glabrous or very sparsely pilose on the margins, yellowish-fuscous. Flowering-bracts similar to the involucral-bracts. Receptacle pilose. Female flowers: Sepals 3, green at the tips, ciliate. Petals 3, much shorter than the sepals, shortly spathulate, hairy all round, white, with a gland near the apex. Male flowers shortly pedicellate. Sepals 3, free, shorter than the petals, ovate, green at the apex. Petals unequal, broad, ciliate, with a gland near the apex. Anthers black.

Lower Guinea. Angola: Huilla, *Antunes.*

Said to be allied to *E. Teusczii*, Engl. & Ruhland, and from description appears to be near *E. Bauri*, N. E. Br., from South Africa. I have not seen it, and do not understand the use of the term lanceolate as applied to the leaf, which is stated to be only $\frac{3}{4}$ millimetre broad in the upper part. Probably the sepals are dark olive or fuscous at the apex, rather than green as described.

23. **E. afzelianum,** *Wikstr. ex Koernicke in Linnæa*, xxvii. 680. Stemless. Leaves 7–15 to a plant, ascending, $\frac{1}{2}$–$1\frac{3}{4}$ in. long, $\frac{2}{3}$–2 lin. broad, linear, acute or subobtuse, 4–10-nerved, glabrous. Peduncles very variable, 1–20 to a plant, 3–9 in. long, acutely 4–5-angled, glabrous, their sheaths 1–2 in. long, acute, glabrous. Heads $1\frac{1}{2}$–$2\frac{1}{2}$ lin. in diam., subglobose, monœcious, with the sexes intermixed, whitish, slightly ochreous or greyish. Involucral-bracts $\frac{3}{4}$–1 lin. long, $\frac{1}{3}$–$\frac{2}{3}$ lin. broad, oblong or cuneate-oblong, obtuse, slightly rigid, pale straw-coloured, glabrous. Flowering-bracts about 1–$1\frac{1}{4}$ lin. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad, cuneate-obovate, acute or acuminate, incurved, ochreous or fuscous, more or less densely pubescent with white hairs on the apical part. Receptacle pilose. Female flowers shortly pedicellate or subsessile. Sepals 3, subunequal, $\frac{3}{4}$–1 lin. long, $\frac{1}{7}$–$\frac{1}{6}$ lin. broad, ochreous or fuscous, bearded with white hairs on the apical part; the lateral pair linear-falcate, boat-shaped, obtuse; the odd sepal cuneate-linear, obtuse, nearly flat. Petals 3, unequal, inserted above the sepals and exceeding them, the largest $\frac{3}{4}$ lin. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, oblanceolate, cuneate at the base, obtuse, rather thick and somewhat spongy, white, sometimes slightly tinted with fuscous at the apex, slightly pubescent with white hairs on both sides or more densely so on the back, ciliate at the apex, glandless; the other two similar, but smaller, thinner and less hairy or nearly glabrous on both sides. Male flowers shortly pedicellate. Sepals 3, $\frac{3}{4}$–1 lin. long, more or less connate into a funnel-shaped body open down one side, and trifid, with unequal obtuse lobes, or sometimes free, ochreous or fuscous, pubescent with white

hairs at the apex. Stipes between the sepals and petals $\frac{1}{3}$–$\frac{1}{2}$ lin. long. Petals unequal, ovate-lanceolate, acute, white, glandless, ciliate, the largest not more than $\frac{1}{4}$–$\frac{1}{3}$ lin. long. Anthers blackish. Seeds $\frac{1}{6}$ lin. long, ellipsoid, white-reticulate.—Ruhland in Engl. Jahrb. xxvii. 82.

Upper Guinea. Sierra Leone: in marshes at Kitchom, near the mouth of the River Scarcies, *Scott-Elliot*, 4339! and without precise locality, *Afzelius!* Niger Territory: Nupe; in swamps about Jeba, *Barter*, 1019!

24. **E. plumale,** *N. E. Br.* Stemless. Leaves numerous, in a radical rosette, $\frac{1}{3}$–$\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{1}{2}$ lin. broad, linear, tapering to a very fine point, 3-nerved, glabrous. Peduncles several to a plant, 3–6 in. long, terete, 5–6-ribbed, glabrous; their sheaths $\frac{3}{4}$–$1\frac{1}{2}$ in. long, acute, glabrous. Heads 2–3 lin. in diam., at first globose, afterwards elongating and becoming oblong, monœcious, with the sexes intermixed, white, very woolly in appearance. Involucral-bracts about 1 lin. long and broad, elliptic or orbicular, very obtuse, glabrous, spreading. Flowering-bracts $1\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad, cuneate-obovate or rhomboid, suddenly narrowed to a very fine point, whitish, with a dark fuscous band across the broadest part, pubescent and ciliate, with very minute white hairs on the apical part. Receptacle glabrous. Female flowers sessile. Sepals 2, free, equal, $\frac{3}{4}$–1 lin. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, subspathulate, falcately boat-shaped, with a broad thick spongy keel, obtuse, apiculate, entire or more or less toothed on the keel and sides at the top, fuscous, glabrous. Petals 3, longer than the sepals, unequal, $\frac{3}{4}$–$1\frac{1}{4}$ lin. long, $\frac{1}{8}$–$\frac{1}{5}$ lin. broad, linear-spathulate, obtuse, white, hairy above the middle within, with a very minute black gland near the apex. Male flowers often abortive, sessile. Sepals 2, or rarely 3, filiform, 1 lin. long, fuscous at the apex, glabrous. Stipes between the sepals and petals as long as the sepals, flat. Petals 3, unequal, white, very hairy within, with a very minute black gland near the apex; dorsal petal twice as long as the others, 1 lin. long, $\frac{1}{4}$ lin. broad, projecting beyond the bracts like a little white plume. Anthers black. Seeds $\frac{1}{4}$–$\frac{1}{3}$ lin. long, narrowly ellipsoid, apiculate at one end, brown, seen to be marked with longitudinal rows of short transverse papillæ when highly magnified.

Upper Guinea. Senegambia, *Heudelot*, 148!

This species is well marked by the very different form of the sepals in the male and female flowers, and by the somewhat plumose appearance of the ultimately oblong heads, due to the protruding odd petal of the male flowers. It is allied to the following species, but besides the differences noted thereunder, the much shorter, terete, 5–6-ribbed (not acutely angular) peduncles will at once distinguish it.

25. **E. senegalense,** *N. E. Br.* Leaves numerous, in a dense rosette, spreading, 5–7 lin. long, $\frac{1}{2}$–$\frac{2}{3}$ lin. broad, linear, acuminate, glabrous. Peduncles 1 or few to a plant, 16–22 in. long, about $\frac{1}{5}$ lin. thick, acutely 4-angled, glabrous. Heads 2–3 lin. in diam., whitish, monœcious. Involucral-bracts 1 lin. long, $\frac{2}{3}$–$\frac{3}{4}$ lin. broad, somewhat orbicular-obovate, very shortly cuspidate-acute, ochreous or straw-coloured, glabrous. Flowering-bracts $\frac{3}{4}$–1 lin. long, and as much in breadth, very broadly cuneate-obovate, shortly and very abruptly

cuspidate-acute, straw-coloured, thinly bearded with minute white hairs on the apical part. Receptacle pilose. Female flowers subsessile. Sepals 2, equal, $\frac{2}{3}$ lin. long, $\frac{1}{3}$ lin. or rather more in breadth from front to back, spathulate-suborbicular viewed sideways, with a very broad wing-like keel, rather coarsely toothed on the keel and apical part of the sides, with the actual apex produced into a very short bristle-like mucro, straw-coloured, glabrous. Stipes between the sepals and petals very short. Petals 3, equal, much exceeding the sepals, $\frac{3}{4}$ lin. long, $\frac{1}{8}$–$\frac{1}{6}$ lin. broad, cuneately spathulate, very pale yellowish-white, glabrous on both sides, ciliate with white hairs at the apex, two of them furnished with a very conspicuous black gland near the apex, the other glandless. Ovary compressed or trigonous, with a bifid or trifid style. Male flowers sessile or subsessile. Sepals 2, free to the base, $\frac{2}{3}$–$\frac{3}{4}$ lin. long, subulate or filiform, pale straw-coloured, glabrous. Stipes between the sepals and petals exceeding the sepals, nearly or quite 1 lin. long, stout, flattened, curved, pale straw-coloured. Petals 3, very unequal; the larger $\frac{3}{4}$–1 lin. long, linear or linear-spathulate, projecting beyond the bracts like a little white plume, the two smaller $\frac{1}{8}$–$\frac{1}{6}$ lin. long, linear, all densely bearded all over the inner face with long white hairs, and furnished with a black gland near the apex, that on the larger petal being very minute or absent. Stamens 6; anthers black.

Upper Guinea. Senegal, *Heudelot*, 680!

This is closely allied to *E. plumale*, N. E. Br., differing in its fewer and very much longer peduncles (which are out of all proportion to the small size of the rosette of leaves), in the entirely straw-coloured flowering-bracts and sepals of the female flowers and rather stouter sepals of the male flowers. The outer flowers of the head are all male, with very long stipes between the sepals and the petals, then come several series of female flowers, and the centre occupied with males which have scarcely any stipes, but the stipes may grow out later, as the only head examined was rather young. This and *E. plumale* are remarkably distinct from all the other African species in the very great difference in the form of the sepals of the male and female flowers, and in the disparity in the number of sepals and petals, for in all the female flowers I have examined I constantly found 2 sepals and 3 petals present: occasionally, but rather rarely, a third sepal is present in the male flowers.

26. **E. zambesiense,** *Ruhland in Engl. Jahrb.* xxvii. 75. Stemless. Leaves all radical, $1\frac{1}{2}$–6 in. long, $1\frac{1}{2}$–$2\frac{1}{4}$ lin. broad, linear, flat, obtuse or acute, many-nerved, glabrous. Peduncles numerous, 6–15 in. long, slightly 5–6-ribbed, glabrous; their basal-sheaths $1\frac{1}{2}$–4 in. long, oblique at the mouth, acute or obtuse, glabrous. Heads 2–3 lin. in diam., globose, greyish-white, monœcious, with the outer flowers female. Involucral-bracts $\frac{3}{4}$–1 lin. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, linear-oblong, obtuse, submembranous, glabrous, light brownish-white. Flowering-bracts 1–$1\frac{1}{4}$ lin. long, $\frac{1}{2}$ lin. broad, oblong or subspathulate-obovate, acute or obtuse, concave, entire or very minutely serrulate near the apex, light fuscous, outermost nearly or quite glabrous, inner bearded with white hairs at the apex. Receptacle hairy. Female flowers subsessile or very shortly pedicellate, larger than the male flowers. Sepals about 1 lin. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad from front to back, concave, with a thick very

gibbous keel, blackish or dark fuscous, hairy inside and bearded with white hairs at the apex. Petals arising about $\frac{1}{8}$ lin. above the sepals, $\frac{3}{4}$–1 lin. long, $\frac{1}{4}$ lin. broad, cuneate-oblong or somewhat spathulate-oblong, obtuse, whitish, bearded within with white hairs, and with a black gland near the apex. Ovary trigonous, glabrous; style very deeply trifid. Male flowers numerous, shortly pedicellate. Sepals free or more or less connate below, $\frac{3}{4}$ lin. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, oblong, obtuse, fuscous, bearded with white hairs at the apex. Stipes between the sepals and petals $\frac{1}{4}$–$\frac{1}{2}$ lin. long. Petals often unequal, $\frac{1}{4}$–$\frac{1}{2}$ lin. long, oblong, obtuse, whitish, bearded with white hairs within, and with a black central gland. Stamens as long as the petals; anthers black.

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan!* Mount Malosa, 4000-6000 ft., *Whyte!* Mount Zomba, 4000–6000 ft. *Whyte!* (*Johnston* ex *Ruhland*, by error).

Ruhland has described the female bracts as villous and the male bracts as subglabrous at the apex, and the petals of the male flowers as glandless. I find them to be the reverse of this. The heads are viviparous in the Mount Zomba specimens.

27. **E. Hanningtonii,** *N. E. Br.* Plant stemless. Leaves about 6–8, ascending or spreading, 1–1$\frac{1}{3}$ in. long, 1$\frac{1}{2}$–2$\frac{1}{2}$ lin. broad, linear, acute, flat, 9–13-nerved, glabrous. Peduncles several to a plant, 2$\frac{1}{2}$–5 in. long, slender, acutely 5-angled, glabrous; their sheaths 1–1$\frac{1}{3}$ in. long, acute, loose, glabrous. Heads 2–2$\frac{1}{2}$ lin. in diam., subglobose, monœcious, grey. Involucral-bracts shorter than the young head, spreading, not becoming reflexed, nearly 1 lin. long, $\frac{2}{3}$–$\frac{3}{4}$ lin. broad, obovate-oblong, very obtuse, glabrous, light brownish-white. Flowering-bracts about 1 lin. long, $\frac{1}{3}$ lin. broad, subspathulate-obovate, acute, concave, fuscous, thinly pubescent with white hairs on the apical part. Receptacle thinly pilose. Female flowers in several exterior rows, pedicellate. Sepals 3, subequal, $\frac{2}{3}$–$\frac{3}{4}$ lin. long, $\frac{1}{5}$ lin. broad, or from front to back, lanceolate, acute or obtuse, boat-shaped, one less concave than the other two, acutely keeled and somewhat gibbous on the back, blackish or dark fuscous, ciliate with a few white hairs at the apex and occasionally one or two on the keel, glabrous within. Petals about $\frac{3}{4}$ lin. long, $\frac{1}{8}$ lin. broad, linear-cuneate, obtuse, glabrous on both sides, ciliate with a few white hairs at the apex, white, glandless or with a minute black gland just below the apex. Male flowers central, pedicellate. Sepals $\frac{1}{2}$ lin. long, connate into a funnel-shaped body open down one side, 3-crenate or 3-lobed and ciliate at the apex, fuscous. Stipes between the sepals and petals about $\frac{1}{4}$ lin. long. Petals unequal, minute, the largest not more than $\frac{1}{4}$ lin. long, ovate, acute, tipped with 1–2 hairs, white. Anthers black.

Mozamb. Dist. German East Africa; Kwa Chiropa, *Hannington!*

This is very similar to E. *zambesiense*, Ruhland, in appearance, but, in the single example seen, the peduncles are much shorter and the flowers are quite different in structure. From E. *elegantulum*, Engl. (which it also closely resembles), the pallid involucral-bracts will at once discriminate it.

28. **E. infaustum,** *N. E. Br.* Plant stemless. Leaves about 5–8, radical, erect, 1$\frac{1}{2}$–5 in. long, 1$\frac{1}{2}$–2 lin. broad, linear, acute, flat,

7–11-nerved, glabrous. Peduncles 10–20 to a plant, 5–8 in. long, slender, acutely 5-angled, glabrous; their sheaths $1\frac{3}{4}$–3 in. long, acute, rather loose, glabrous. Heads 2–$2\frac{3}{4}$ lin. in diam., globose, monœcious, grey. Involucral-bracts much longer than the young heads and in that stage radiating, ultimately reflexed, $1\frac{3}{4}$ lin. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad, linear-lanceolate, subobtuse, pallid or light greenish. Flowering-bracts 1 lin. long, $\frac{1}{4}$ lin. broad, oblong-oblanceolate, acute, concave, blackish, densely covered with white hairs on the apical part. Receptacle pilose. Female flowers numerous, in many series, pedicellate. Sepals 3, equal, $\frac{2}{3}$–$\frac{3}{4}$ lin. long, $\frac{1}{5}$ lin. broad, oblong or oblong-lanceolate, acute, somewhat boat-shaped, slightly ciliate at the apex, blackish. Petals $\frac{2}{3}$ lin. long, $\frac{1}{8}$ lin. broad, linear, obtuse, whitish, with an apical black gland and tipped with a fringe of white hairs. Male flowers central, pedicellate. Sepals $\frac{3}{4}$ lin. long, connate into a funnel-shaped body open down one side, 3-lobed at the apex, glabrous, blackish. Stipes between the sepals and petals $\frac{1}{4}$ lin. long. Petals minute, unequal, the largest not more than $\frac{1}{4}$ lin. long, oblong, white, ciliate with white hairs at the apex and with a minute black apical gland. Seeds $\frac{1}{4}$ lin. long, ellipsoid, brown, covered with transverse rows of very minute whitish, somewhat glittering papillæ.

Mozamb. Dist. Portuguese East Africa: Quilimane, in rice fields, *Scott!*

This is probably the same as a plant collected in Zanzibar by Bojer (88), which is quoted by Koernicke in Linnæa xxvii. 646; in Durand & Schinz, Conspect. Fl. Afr. v. 503; in Engl. Pfl. Ost-Afr., C. 133; and by Ruhland in Engl. Jahrb. xxvii. 81, under *E. trilobum*, Ham.

29. **E. elegantulum,** *Engl. Pfl. Ost-Afr. C.* 133. Stemless. Leaves 4–10, radical, usually erect, $\frac{1}{3}$–3 in. long, $\frac{1}{2}$–$2\frac{1}{2}$ lin. broad, linear, acute, flat, 3–11-nerved, glabrous. Peduncles 2–16 to a plant, 1–$8\frac{1}{2}$ in. long, slender, acutely 3–4-angled, glabrous; their sheaths $\frac{1}{3}$–3 in. long, acute, rather inflated, glabrous. Heads $1\frac{1}{4}$–2 lin. in diam., globose, monœcious, with the male flowers usually central, greyish-white. Involucral-bracts much shorter than the young heads, ultimately reflexed, $\frac{1}{2}$–$\frac{2}{3}$ lin. long, $\frac{1}{4}$–$\frac{1}{2}$ lin. broad, oblong or subquadrate, very obtuse, fuscous, glabrous. Flowering-bracts $\frac{1}{2}$–$\frac{2}{3}$ lin. long, $\frac{1}{4}$ lin. broad, cuneate-oblong or cuneate-obovate, obtuse or subacute, dark fuscous, densely covered with short white hairs on the apical part. Receptacle glabrous. Female flowers very numerous, pedicellate. Sepals 3, slightly unequal, $\frac{1}{3}$–$\frac{1}{2}$ lin. long, $\frac{1}{8}$ lin. broad, oblanceolate or cuneate-oblong, obtuse or subacute, two of them more boat-shaped than the third and sometimes gibbous on the back, dark fuscous, bearded with a few white hairs on the keel and at the apex. Petals 3, arising close to the sepals, $\frac{1}{3}$–$\frac{1}{2}$ lin. long, $\frac{1}{8}$ lin. broad, linear-spathulate or cuneate-oblanceolate, subobtuse, whitish, tipped with a few white hairs and with a very minute black gland just below the apex. Male flowers rather few. Sepals $\frac{1}{3}$ lin. long, more or less connate into a funnel-shaped body open down one side, trifid or obtusely 3-lobed at the apex, fuscous, ciliate with white hairs. Stipes between the sepals and

petals $\frac{1}{5}$–$\frac{1}{4}$ lin. long. Petals rudimentary or one of them about $\frac{1}{5}$ lin. long, ciliate. Seeds $\frac{1}{8}$–$\frac{1}{5}$ lin. long, ellipsoid, brown, thinly covered with very minute white papillæ.—Ruhland in Engl. Jahrb. xxvii. 83.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, ser. iii. 223! Witu; between Fungo Zombo and Witu, *Dennhardt*.

Mozamb. Dist. Zanzibar: near the town of Zanzibar, *Kirk! Hildebrandt*, 1056. German East Africa: Usambara; Duga, *Holst*, 3181!

E. elegantulum, Engl., closely resembles *E. Hanningtonii*, N. E. Br. and *E. zambesiense*, Ruhland, in general appearance, but the short blackish (not pallid) involucral-bracts, which are best seen in the very young heads, readily distinguish it from those species.

30. **E. Schlechteri,** *Ruhland in Engl. Jahrb.* xxvii. 78. Leaves $\frac{3}{4}$–$1\frac{1}{4}$ in. long, 1–$1\frac{1}{2}$ lin. broad, linear, mucronate or somewhat obtuse, 7–9-nerved, glabrous, white-punctulate above. Peduncles 2–3 to a plant, 2–3 times longer than the leaves, acutely ribbed; their sheaths about equalling the leaves, glabrous. Heads globose, somewhat glabrous. Involucral-bracts slightly longer than the flowers, ovate, obtuse, somewhat glabrous, greenish-grey. Flowering-bracts like the involucral-bracts. Receptacle pilose. Female flowers: Sepals 3, narrowly ovate, almost glabrous, yellowish. Petals 3, equal, slightly narrower than the sepals, thinly hairy near the tips, with a black gland near the apex. Male flowers: Sepals connate for about $\frac{1}{3}$ of their length; lobes elongate-spathulate, irregularly denticulate at the apex, glabrous, greyish-white. Petals very minute, roundish, with an oblong black gland, glabrous. Anthers blackish-brown.

Mozamb. Dist. Portuguese East Africa: Gasaland; in a swamp at Inhambane, *Schlechter*, 12093!

The above locality is just south of the Tropic of Capricorn, but doubtless the plant occurs within the Tropical area. I have not seen it.

31. **E. subulatum,** N. E. Br. Plant small, stemless. Leaves several, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{1}{2}$ lin. broad, subulate, gradually tapering to a fine point, flat above, very convex beneath, 1–3-nerved, glabrous. Peduncles numerous, varying from shorter to longer than the leaves, $\frac{3}{4}$–$2\frac{1}{4}$ in. long, square, glabrous; their sheaths $\frac{1}{4}$–$\frac{1}{2}$ in. long, somewhat close-fitting, subacute, membranous. Heads $1\frac{1}{4}$–$1\frac{1}{2}$ lin. in diam., globose, monœcious, blackish. Involucral-bracts $\frac{2}{3}$–$\frac{3}{4}$ lin. long, oblong, or oblong-obovate, acute, fuscous or somewhat pallid, spreading or slightly reflexed, glabrous. Flowering-bracts like the involucral-bracts, dark fuscous or blackish, glabrous. Receptacle thinly pilose. Female flowers numerous, subsessile. Sepals 3, often unequal, nearly $\frac{2}{3}$ lin. long, $\frac{1}{6}$ lin. broad, lanceolate, acute or acuminate, boat-shaped, sometimes slightly gibbous on the back, fuscous, slightly ciliate with dusky hairs. Petals 3, slightly unequal, scarcely $\frac{1}{2}$ lin. long, $\frac{1}{10}$ lin. broad, linear, subacute, dark fuscous, glabrous. Male flowers not very numerous, shortly pedicellate. Sepals $\frac{1}{3}$ lin. long, united into a funnel-shaped body open down one side, shortly 3-lobed and denticulate at the apex, fuscous. Stipes between the sepals and petals $\frac{1}{4}$ lin. long,

Petals unequal, minute, the largest $\frac{1}{6}$–$\frac{1}{4}$ lin. long, oblong-ovate. Anthers black. Seeds about $\frac{1}{6}$ lin. long, oblong-ellipsoid, brown, glabrous.

Mozamb. Dist. British Central Africa: Zambesi River, on an island at Victoria Falls, *Kirk!*

This is very near *E. ciliisepalum*, Rendle, and may be only a robust form of that species, but it differs in appearance, in its stouter subulate leaves, more numerous and stouter peduncles, larger heads, larger flowers, and the slightly different form of the sepals and petals.

32. **E. ciliisepalum,** *Rendle in Cat. Afr. Pl. Welw.* ii. 98. A small, tufted plant, stemless, apparently an annual. Leaves $\frac{1}{3}$–1 in. long, $\frac{1}{8}$–$\frac{1}{4}$ lin. broad, very slender, filiform, glabrous. Peduncles $\frac{1}{2}$–$1\frac{1}{2}$ in. long, filiform; their sheaths not exceeding 4–5 lin. in length, oblique at the mouth, acute, glabrous. Heads 1–$1\frac{1}{3}$ lin. in diam., subglobose, truncate at the base, with a whitish involucre and blackish disk, few-flowered, monœcious, with the outer flowers female. Involucral-bracts $\frac{2}{3}$ lin. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, oblong-lanceolate or elliptic-oblong, acute or subobtuse, glabrous. Flowering-bracts $\frac{2}{3}$–$\frac{1}{2}$ lin. long, $\frac{1}{5}$–$\frac{1}{4}$ lin. broad, ovate or elliptic to oblong-lanceolate, acute, glabrous, fuscous. Female flowers sessile. Sepals 3, equal, $\frac{1}{3}$–$\frac{1}{2}$ lin. long, $\frac{1}{6}$ lin. broad, lanceolate, acute, very concave, sparsely ciliate along the margins, otherwise glabrous, fuscous. Petals 3, arising close to the sepals, $\frac{1}{2}$ lin. long, narrowly-linear, acute. Male flowers shortly pedicellate. Sepals united into a funnel-shaped body, open down one side, bifid or trifid at the apex, glabrous, fuscous. Stipes between the sepals and petals scarcely $\frac{1}{3}$ lin. long. Petals rudimentary, triangular-ovate, with a blackish gland below the apex. Anthers blackish.

Lower Guinea. Angola: Huilla; in damp fields in which maize has been cultivated, near Lopollo, 5000 ft., *Welwitsch*, 2445! on spongy slopes of Morro de Lopollo, below the old fortress, *Welwitsch*, 2445B! Huilla to Humpata, *Johnston!*

Johnston's specimens are stouter, and have more numerous flowers in the heads than any of those collected by Welwitsch, but I find no difference in the structure of the flowers and bracts.

33. **E. mutatum,** *N. E. Br.* Stemless. Leaves 2–8 lin. long, $\frac{1}{4}$–$\frac{1}{2}$ lin. broad, subulate, tapering to a fine point, glabrous. Peduncles numerous, from less than 1 in. to $4\frac{1}{2}$ in. long, $\frac{1}{8}$–$\frac{1}{5}$ lin. thick, filiform, 3–4-angled, glabrous; their sheaths 3–10 lin. long, obtuse, often torn at the apex, rather loose in the upper part, with a long oblique mouth. Heads 1–2 lin. thick, subglobose, monœcious, with female flowers on the outside and male and female mixed in the centre, black. Involucral-bracts $\frac{1}{2}$–$\frac{2}{3}$ lin. long, about $\frac{1}{3}$ lin. broad, oblong, obtuse, fuscous. Flowering-bracts $\frac{2}{3}$–$\frac{3}{4}$ lin. long, $\frac{1}{3}$ to nearly $\frac{1}{2}$ lin. broad, elliptic-lanceolate, or lanceolate acute, concave, blackish, glabrous. Receptacle glabrous. Female flowers sessile. Sepals 2, about $\frac{1}{2}$ lin. long and as much in breadth, obliquely suborbicular in outline, apiculate, finely toothed on the upper part of

the sides and coarsely toothed on the broad wing-like keel, which is about as broad as the rest of the sepal, membranous, blackish, glabrous. Petals 2, arising slightly above the sepals, $\frac{1}{2}$ lin. long, about $\frac{1}{6}$ lin. broad, narrowly cuneate, shortly bifid or rounded at the apex, glabrous, without glands, blackish or very dark fuscous. Ovary transversely oblong; styles 2, filiform, exceeding the petals. Male flowers shortly pedicellate. Sepals scarcely $\frac{1}{2}$ lin. long, linear or cuneately oblong, rounded or toothed at the apex, glabrous, fuscous; petals rudimentary. Stamens 4; anthers black.—*E. huillense*, Rendle in Cat. Afr. Pl. Welw. ii. 95, not of Engl. & Ruhland.

Lower Guinea. Angola: Huilla; in somewhat spongy wooded marshy meadows between Lopollo and Monino, 3800–5500 ft., *Welwitsch*, 2448! on boggy slopes, *Welwitsch*, 2449! very sparsely on the lofty pastures of Empalanca, which are flooded in summer, *Welwitsch*, 2450!

As the name *E. huillense*, Engl. & Ruhland, claims priority by about a month, I have been obliged to change the name of this species.

34. **E. gilgianum,** *Ruhland in Engl. Jahrb.* xxvii. 84. Leaves 4–7 lin. long, $\frac{1}{4}$ lin. broad, narrowly linear, acute, 1-nerved, glabrous. Peduncles 3–4 to a plant, up to $1\frac{3}{4}$ in. long, 3–4 times as long as the leaves, glabrous, with sheaths shorter than the leaves. Heads small, about $\frac{3}{4}$ lin. in diam., glabrous, greenish or blackish. Involucral-bracts obtuse or somewhat acute, glabrous, greenish. Flowering-bracts obovate, somewhat glabrous ("glabriusculis," i.e., probably slightly pubescent), those of the female flowers obtuse, of the male flowers acute. Receptacle pilose. Female flowers: Sepals ovate, acute, ciliate all round, pale greenish-yellow. Petals lanceolate, acute, nearly glabrous, without glands. Male flowers: Sepals connate into a spathe-like body, with 2 to several irregular acute lobes, nearly glabrous, greenish. Petals none. Anthers black.

Lower Guinea. Angola: Huilla, *Antunes*, 168.

Stated to be the smallest of the African species and one of the smallest species in the genus, having an especially slender appearance on account of the capillary leaves. I have not seen it.

35. **E. abyssinicum,** *Hochst. in Flora*, 1845, 341. Plant small, stemless, annual? Leaves about 4–8 to a plant, radical, $\frac{1}{3}$–$\frac{3}{4}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, linear-subulate, tapering to a very fine point, glabrous. Peduncles $\frac{3}{4}$–4 in. long, 3–4-angled, slender, glabrous, their sheaths $\frac{1}{4}$–1 in. long, acute, very oblique and slightly inflated at the mouth, glabrous. Heads 1–$1\frac{1}{4}$ lin. in diam., subglobose, monœcious. Involucral-bracts $\frac{2}{3}$–$\frac{3}{4}$ lin.long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, oblong, obtuse or acute, concave, light straw-coloured, glabrous. Flowering-bracts $\frac{1}{2}$–$\frac{2}{3}$ lin. long, $\frac{1}{4}$ or less broad, lanceolate, acute, concave, glabrous, varying from light fuscous to blackish. Receptacle glabrous or nearly so. Female flowers subsessile. Sepals 3, subequal, $\frac{1}{2}$ lin. long, about $\frac{1}{8}$ lin. broad, lanceolate, acuminate, boat-shaped, glabrous, light fuscous or greenish-fuscous. Petals 3, arising slightly above the sepals, rather less than $\frac{1}{2}$ lin. long, about $\frac{1}{12}$ lin. broad, linear, acute, flat, glabrous, not ciliate, without glands, pallid or fuscous. Style bifid to half-way down. Male flowers rather few, pedi-

cellate. Sepals connate into a narrowly funnel-shaped body $\frac{1}{3}$–$\frac{1}{2}$ lin. long, deeply cleft on one side, denticulate at the apex, glabrous, light fuscous. Petals reduced to very minute lobules at the apex of the $\frac{1}{6}$ lin. long stipes, glabrous. Anthers black. Seeds about $\frac{1}{6}$ lin. long, ellipsoid, smooth, brown.—Steud. Syn. Pl. Glum. ii. 273; Koernicke in Linnæa, xxvii. 612; Engl. Hochgebirgsfl. Trop. Afr. 154; Schweinf. Beitr. Fl. Aethiop. 295; Durand & Schinz, Conspect. Fl. Afr. v. 502; Ruhland in Engl. Jahrb. xxvii. 84; N. E. Br. in Dyer, Fl. Cap. vii. 53. *E. Richardi*, Koernicke in Schweinfurth, Beitr. Fl. Aethiop. 309, name only; Durand & Schinz, Conspect. Fl. Afr. v. 503; Ruhland in Engl. Jahrb. xxvii. 85. *E. sexangulare*, A. Rich. Tent. Fl. Abyss. ii. 347 (excl. all syns.); Koernicke in Linnæa, xxvii. 613, 615; Durand & Schinz, Conspect. Fl. Afr. v. 503; Ruhland in Engl. Jahrb. xxvii. 83, partly, not of Linn. *E. minimum*, Ruhland in Engl. Jahrb. xxvii. 85, not of Lam.

Nile Land. Abyssinia: on the mountain plains in the Province of Shire, *Schimper*, 1944! Tigre; in inundated places near Tchelatchekenneh, *Quartin-Dillon*.

Also in South Africa.

36. **E. Heudelotii,** *N. E. Br.* Plants small, tufted, stemless. Leaves few, in a radical rosette, erect, $\frac{1}{2}$–$\frac{3}{4}$ in. long, $\frac{1}{4}$–$\frac{1}{2}$ lin. broad, linear, tapering to a very fine hair-like point, 1–3-nerved, glabrous. Peduncles 1–3 to a plant, $1\frac{1}{4}$–$3\frac{1}{4}$ in. long, subterete, slightly striate in the dried state, glabrous; their sheaths 4–7 lin. long, acute, glabrous. Heads $1\frac{1}{2}$–2 lin. in diam., somewhat hemispherical, monœcious, with the sexes intermixed, light brownish. Involucral-bracts $\frac{3}{4}$–1 lin. long, $\frac{1}{2}$ lin. broad, cuneate-oblong, or somewhat obovate, very obtuse, slightly lacerate-denticulate at the apex, light ochreous-brown, glabrous. Flowering-bracts $\frac{3}{4}$–1 lin. long, $\frac{1}{6}$–$\frac{1}{5}$ lin. broad, linear-oblanceolate, acute, very thin and membranous, glabrous. Receptacle glabrous. Female flowers very numerous, pedicellate, entirely destitute of sepals or petals, or with 2 filiform simple or bifid sepals at the middle of the pedicel; pedicels about $\frac{1}{4}$ lin. long; style trifid to half-way down, or expanding upwards into a thin, flat, membranous, linear, entire, bifid or trifid blade. Male flowers comparatively few, long-pedicellate. Sepals connate into a somewhat funnel-shaped body $\frac{1}{3}$ lin. long, open down one side, toothed at the apex, very membranous, fuscous, glabrous. Stipes between the sepals and stamens 0–$\frac{1}{4}$ lin. long. Petals rudimentary or absent. Anthers yellowish. Seeds $\frac{1}{6}$ lin. long, ellipsoid-oblong, ochreous, smooth.

Upper Guinea. Senegambia: without precise locality, *Heudelot*, 677! 678!

37. **E. amboense,** *Schinz in Bull. Herb. Boiss.* iv. *App.* iii. 35. Plant stemless, $1\frac{1}{2}$–$2\frac{1}{2}$ in. high. Leaves numerous, $\frac{3}{4}$–$1\frac{1}{3}$ in. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad, linear, tapering to a very fine point, flaccid, tessellately veined, glabrous. Peduncles 5 or 6 to a plant, 1–$1\frac{3}{4}$ in. long, slender, terete, glabrous, green; their basal sheaths 5–8 lin. long, slightly inflated, obtuse, glabrous, green. Flower-heads hemispherical, blackish or dark

chestnut, about $1\frac{3}{4}$ lin. in diam., monœcious, with the outer flowers female. Involucral-bracts $\frac{3}{4}$ lin. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad, oblong, obtuse or acute, entire, very thin and membranous, fuscous, glabrous. Flowering bracts about $\frac{3}{4}$ lin. long, lanceolate or spathulate-lanceolate, very acute, entire, membranous, fuscous or dull olive-green, glabrous. Receptacle glabrous. Female flowers pedicellate. Sepals 2, free, about $\frac{1}{2}$ lin. long, linear-lanceolate, acute, membranous, fuscous, somewhat tessellated, glabrous. Petals none. Stipes between the sepals and ovary none or excessively short. Ovary flattened, orbicular in outline, glabrous; style divided to about the middle into 2 filiform branches. Male flowers pedicellate, glabrous. Sepals 2 or rarely 3, free (always ?), about $\frac{1}{2}$ lin. long, linear-lanceolate, acute, membranous, fuscous. Stipes between the sepals and petals variable, sometimes half as long as the sepals. Petals reduced to 3 very minute ovate white segments about $\frac{1}{10}$–$\frac{1}{8}$ lin. long, bearing a black gland at their middle. Stamens 4 or 6; anthers yellowish.

Lower Guinea. German South-west Africa: Amboland; on the margin of a pool at Uashitenga, near Olukonda, *Schinz*, 859 !

I do not find that the bracts are lacerate as stated in the original description, and it is only the outermost or involucral bracts that are sometimes obtuse; both in the type specimen (which Prof. Schinz has kindly allowed me to examine) and in the example at Kew they are as described above. I find only 2 sepals present in the female flowers, but the male flowers seem to be very variable in the number of their parts, some having 2 sepals, 3 petals, and 4 stamens, others 2 sepals, 3 petals and 6 stamens, whilst a few have 3 sepals, 3 petals and 6 stamens.

38. **E. Stuhlmanni,** *N. E. Br.* A very small plant. Leaves almost capillary. Heads glabrous (probably pale brown). Involucral-bracts about as long as the head. Female flower without petals. Sepals unequal, narrowly linear. Male flower with the sepals connate into a spathulate body, trifid at the apex. Anthers white.—*E. sexangulare*, Ruhland in Engl. Jahrb. xxvii. 83, partly, not of Linn.

Mozamb. Dist. German East Africa: Eastern Uzinja, *Stuhlmann*, 3552.

This plant is unhesitatingly referred by Ruhland to *E. sexangulare*, Linn., but that species grows 12–16 in. high and the female flowers have very distinct and rather peculiar petals. I have not seen the plant, but think it possible that Ruhland made the comparison with *E. sieboldianum*, Sieb. & Zucc. (*E. sexangulare*, Mart., not of Linn.) to which, from the description, it appears to be closely related; but I doubt its identity with that plant. The only African species with which it can be compared is *E. amboense*, Schinz, from which it differs (according to the characters given by Ruhland in his key to the species) by the connate sepals of the male flowers.

Imperfectly known species.

39. **E. quinquangulare,** *Linn. Sp. Pl.* 87. Koernicke in Linnæa, xxvii. 642, mentions that there is a specimen of this Indian species in the Stockholm herbarium labelled as having been collected by Afzelius in Sierra Leone, but that there has probably been some exchange of labels.—Durand & Schinz, Conspect. Fl. Afr. v. 503.

2. **MESANTHEMUM**, Koernicke; Benth. et Hook. f. Gen. Pl. iii. 1021.

Sepals 3, free, or shortly connate at the base in the male flowers, hyaline. Petals united into a tube, entire and funnel-shaped in the male flowers, cylindric and divided at the base into 3 claws in the female flowers, subtruncate or shortly 3-lobed at the apex, with 3 glands on the inside near the top of the tube. Stamens 6, in two alternating series, included within the tube. Ovary 3-celled; style 3-branched; branches simple and filiform, without alternating appendages.—Marsh herbs, stemless or with a more or less elongating and rooting stem or rhizome. Leaves broadly linear, in a dense tuft. Peduncles 1-headed, longer than the leaves. Heads monœcious, with a campanulate involucre, flat-topped or perhaps at length convex. Flowering-bracts with a capillary stalk and a clavate head. Other characters as for the Order.

Species 4, the following, and 2 others that are natives of Madagascar.

Inner involucral-scales 1–1½ lin. longer than the outer; heads of the flowering-bracts obtuse, pubescent .	1. *M. radicans.*
Inner involucral-scales 2–3 lin. longer than the outer; heads of the flowering-bracts acute, glabrous	2. *M. prescottianum.*

1. **M. radicans,** *Koernicke in Linnæa*, xxvii. 573. Rootstock stout. Leaves 3–16 in. long, 2–6 lin. broad, linear, tapering to an obtuse or acute point, softly pubescent or glabrous on both sides. Peduncles 1–2⅓ ft. long, nearly 1 lin. thick, terete, striate, more or less pubescent; their basal sheaths 8–9 in. long, acute, with a very oblique mouth 1½ in. long, softly pubescent. Heads 5–7 lin. in diam., flat-topped, monœcious, the outer flowers female, the inner male. Involucre campanulate, its outer scales about 2 lin. long and 2 lin. broad, broadly ovate, obtuse, the inner about 3 lin. long and 1½ lin. broad, oblong, obtuse, slightly radiating, all rigid, whitish-brown or light ochraceous, more or less pubescent. Receptacle flat, covered with long soft dark grey hairs. Flowering-bracts 2 lin. long, with a very fine capillary stalk and a clavate obtuse head, covered with short hairs, white. Female flowers usually pedicellate. Sepals ⅔–1 lin. long, scarcely ⅓ lin. broad, oblong, truncate, denticulate and sometimes ciliate at the apex, very concave, hyaline, white. No stipes between the sepals and petals. Petals 1¼–1¾ lin. long, connate above into a cylindric tube, free below, hairy on the outside and within above the base, ciliate at the slightly trifid apex, whitish, with 3 linear brownish glands near the top of the tube within. Ovary acutely triquetrous, glabrous; style long, with 3 filiform branches. Male flowers pedicellate. Sepals 3, free, 1¼–1⅓ lin. long, ⅓ lin. broad, as long as or longer than the corolla, oblong, obtuse or subtruncate, shortly ciliate at the apex, hyaline, whitish. Stipes between the calyx and corolla about ⅕ lin. long. Corolla ¾ lin. long, tubular, subtruncate or obscurely trifid, ciliate at the apex, glabrous on the outside, white, with 3 minute linear glands on the middle of the

tube within. Stamens 6; anthers white.—Durand & Schinz, Conspect. Fl. Afr. v. 504, and Études Fl. Congo, i. 277; Engl. Pfl. Ost-Afr. C. 133; N. E. Br. in Dyer, Fl. Cap. vii. 58. *Eriocaulon radicans*, Benth. in Hook. Niger Fl. 547; Steud. Syn. Pl. Glum. ii. 273. *E. giganteum*, Afzel. ex Koernicke in Linnæa, xxvii. 573. *E. guineense*, Steud. Syn. Pl. Glum. ii. 273.

Upper Guinea. Senegal: River Senegal, *Perrottet*, 808. Sierra Leone: Bagru River, in wet ground, *Mann*, 899! in a small stream near Regent, *Scott-Elliot*, 3994! Peninsula of Sierra Leone, *Afzelius!* and without precise locality, *Hart! Smeathman! Don!* Liberia: Grand Bassa, *Ansell!* Lagos: in a swamp, *Barter*, 20211! Lagos Island, *Barter*, 20219! Yoruba, *Milson!* Niger Delta: Bonny, in open savannah, very common, *Kalbreyer*, 245! Fernando Po and vicinity, *Milne!* Old Calabar, *Robb!*

Lower Guinea. Gaboon: Gaboon River, *Jardin!* French Congo: Loango; in a swamp near Ponta Negra, *Soyaux*, 104! Congo, *Smith!* Angola, *Curror!*

South Central. Congo Free State: Lukolela, *Büttner* (ex *Durand & Schinz*).

The female flowers of this plant are somewhat variable; in some specimens the sepals are only about $\frac{1}{3}$ as long as the corolla, in others about half as long, whilst in Kalbreyer's 245 they are $\frac{3}{4}$ as long; in most examples they are simply denticulate at the apex, but in others they are distinctly ciliate, these two extremes, however, are connected by forms in which the ciliation is represented by one or two hairs only. But I do not consider these differences of specific or even varietal importance in the case of this plant, for in all other characters the plant is fairly uniform.

This species was unfortunately included in the Flora Capensis before I had discovered that all Curror's plants (which are labelled "South of the Tropic") were collected in Angola.

2. **M. prescottianum,** *Koernicke in Mart. Fl. Bras.* iii. i. 472, *t.* 60, *fig.* 1. Leaves $3\frac{1}{2}$–7 in. long, 2–3 lin. broad, linear or lanceolate-linear, acute, more or less folded longitudinally, pilose or glabrous below. Peduncles 9–$14\frac{1}{2}$ in. long, thinly pilose; their sheaths 3–$3\frac{3}{4}$ in. long, thinly pilose. Heads about $\frac{3}{4}$ in. in diam. Involucre campanulate, with long radiating inner bracts, light ochraceous or whitish; outer bracts 2–$2\frac{1}{2}$ lin. long, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. broad, ovate, obtusely pointed, pubescent; inner 5–6 lin. long, $1\frac{1}{2}$ lin. broad, narrowly oblong, obtuse, glabrous or very slightly pubescent. Receptacle flat, covered with long soft whitish hairs. Flowering-bracts about 2 lin. long, with a very fine capillary stalk and a fusiform acute head, glabrous, whitish. Female flowers sessile or subsessile. Sepals nearly as long as the corolla, $1\frac{1}{4}$ lin. long, $\frac{1}{4}$ lin. broad, linear-oblong, acute and sometimes denticulate at the apex, concave, glabrous, hyaline, white. No stipes between the sepals and petals. Petals $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, united into a cylindric tube above, free below, ciliate at the apex, glabrous outside, with a few long hairs inside, and having 3 linear glands in the upper part within the tube. Male flowers pedicellate. Sepals longer than the corolla, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, lanceolate, acute and subdenticulate at the apex, whitish, glabrous. Stipes between the sepals and corolla $\frac{1}{4}$ lin. long. Corolla funnel-shaped, truncate, about 1 lin. long, densely ciliate at the apex, glabrous outside and inside, with three long linear glands inserted

at about the middle inside. Stamens 6; anthers brownish.—Durand & Schinz, Conspect. Fl. Afr. v. 504. *Eriocaulon prescottianum*, Bongard in Mém. Acad. St. Pétersb. 1831, i. 635.

Upper Guinea. Sierra Leone, without indication of the collector!

Bongard states that this plant is a native of Rio de Janeiro, but upon what authority does not appear. He described it from a specimen in the herbarium of Prescott, which was received from Lindley. The Kew example (also received from Lindley), is labelled "Sierra Leone," which is much more likely to be the right habitat than Brazil, since the other species of *Mesanthemum* are all from Tropical Africa and Madagascar. However, as the plant appears not to have been collected again, the locality requires confirmation.

3. **PÆPALANTHUS,** Mart.; Benth. et Hook. f. Gen. Pl. iii. 1022.

Sepals 2–3, free or rarely more or less connate. Petals 2–3; those of the female flowers free, or connate at the middle or upper part and free below; those of the male flowers connate into a campanulate or funnel-shaped tube, which is subtruncate or shortly (rarely deeply) bifid or trifid at the apex. Stamens 2 or 3, of the same number as the petals and opposite to them, free or adhering to the corolla-tube. Ovary 2–3-celled; style divided above into 2–3 simple or bifid, filiform, stigmatic branches, with 2–3 other branches or appendages alternating with them, or arising from the style below them.—Marsh, bog, aquatic or terrestrial, perennial or annual herbs, stemless or with simple or branched leafy stems. Leaves linear or subulate. Peduncles usually one-headed, rarely several-headed, in a few species shorter than the leaves. Flowering-bracts oblong or obovate, flattish or concave. Other characters as for the Order.

A large genus of between 200 and 300 species, of which about 4 occur in Africa, the rest in Tropical America.

Peduncles all central.	
Plant very small, $\frac{1}{2}$–1 in. high; heads $\frac{1}{2}$–$\frac{3}{4}$ lin. in diam.	1. *P. Welwitschii.*
Plant 2–9 in. high; heads 2–3 lin. in diam.	2. *P. Wahlbergii.*
Peduncles all lateral from the axils of the older leaves; plant cushion-like	3. *P. pulvinatus.*

1. **P. Welwitschii,** *Rendle in Cat. Afr. Pl. Welw.* ii. 102. A minute, tufted, stemless plant $\frac{1}{2}$–1 in. high. Leaves numerous, 3–5 lin. long, $\frac{1}{8}$–$\frac{1}{3}$ lin. broad, linear-subulate, acute, rather rigid, glabrous. Peduncles numerous, central, $\frac{1}{4}$–1 in. long, filiform or almost capillary, scantily clothed with rather long gland-tipped hairs; their sheaths 3–5 lin. long, with a tuft of white hairs at the base, very oblique at the mouth, ending in a leaf-like point about $1\frac{1}{2}$ lin. long. Heads very small, $\frac{1}{2}$–$\frac{3}{4}$ lin. in diam., campanulate, becoming subhemispherical in fruit, monœcious, few-flowered, with 4–5 female flowers surrounding 2 males. Involucral-bracts exceeding the disk, $\frac{1}{2}$–$\frac{2}{3}$ lin. long, $\frac{1}{4}$ lin. broad, lanceolate or ovate, subacute, glabrous, thin, whitish, shining. Flowering-bracts rather shorter and narrower than the involucral-bracts, lanceolate or oblong-lanceolate, subacute, glabrous, whitish.

Receptacle hairy. Female flowers sessile. Sepals 3, sometimes unequal, nearly $\frac{1}{3}$ lin. long, lanceolate, acute, boat-shaped, glabrous, sparsely ciliate on the margins, yellowish. Petals about $\frac{1}{3}$ lin. long, whitish. Style with a stout base, dividing into 3 slender stigmatic arms, without any alternating sterile arms. Male flowers subsessile. Sepals $\frac{1}{5}$ lin. long and about half as broad, elliptic, obtuse, glabrous. Petals connate into a short funnel. Stamens 3; anthers white. Seeds ellipsoid, reddish-brown.

Lower Guinea. Angola: Huilla; near Lopollo, in moist fields after the cultivation of *Sorghum*, 5500 ft., *Welwitsch*, 2447 !

2. **P. Wahlbergii,** *Koernicke in Mart. Fl. Bras.* iii. i. 459. Leaves very numerous, in a dense rosette, erect or spreading, $\frac{1}{3}$–1 in. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad, subulate, flat above, convex beneath, very acute, glabrous, woolly at the base. Peduncles few or numerous, central, unequal, 1–9 in. long, filiform, trigonous; glabrous or more or less hairy in the upper part and occasionally all along; their basal sheaths 4–9 lin. long, acute, with a very oblique mouth, glabrous or thinly pubescent with spreading hairs. Heads 2–3 lin. in diam., hemispherical, monœcious, with the sexes intermingled. Involucral-bracts in about 3 series, the inner 1–1$\frac{1}{4}$ lin. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad, oblong or oblong-lanceolate, concave, obtuse or subacute, light brown or fuscous. Flowering-bracts none. Receptacle convex, villous. Pedicels of both sexes villous, $\frac{1}{3}$–$\frac{2}{3}$ lin. long. Sepals of both sexes similar, free, $\frac{1}{2}$–$\frac{7}{8}$ lin. long, lanceolate, boat-shaped, acute, keeled, glabrous, slightly ciliate on the margins below, pale brown or fuscous, those of the female flowers enlarging in fruit. Stipes between the sepals and petals very short in the female flower, and about half as long as the sepals in the male. Female flower: Petals $\frac{1}{2}$–$\frac{2}{3}$ lin. long, free at the base, connate above into a tube, crenulate or minutely 3-lobed at the apex, hairy outside, white, glandless. Ovary triquetrous, glabrous; style with 6 filiform branches, 3 of them ending in globose knobs. Male flower: Corolla a minute funnel-shaped tube, irregular at the mouth. Stamens 2–3; anthers white.—N. E. Br. in Dyer, Fl. Cap. vii. 59; Rendle in Cat. Afr. Pl. Welw. ii. 102; Durand & Schinz, Conspect. Fl. Afr. v. 504. *Dupatya Wahlbergii*, O. Kuntze, Rev. Gen. Pl. ii. 746.

Upper Guinea. Niger Territory: Nupe; in a swamp near Lŏm, *Barter*, 1539 !

Lower Guinea. Angola: Huilla, in spongy or marshy places; near the streams of Morro de Monino, *Welwitsch*, 2454 ! between Lopollo and Monino, *Welwitsch*, 2455 ! and near the banks of the River Quipumpunhine, near Humpata, *Welwitsch*, 2455B !

Mozamb. Dist. German East Africa: Uziba; in Usongora district at the edge of a swamp, *Wilson*, 140 ! Between Lake Tanganyika and Lake Rukwa, 6000 ft., *Nutt !*

Also in the Transvaal.

3. **P. pulvinatus,** *N. E. Br.* Plant very dwarf, stemless. Leaves very numerous (200–300), densely crowded into a cushion-like rosette 1–1$\frac{1}{4}$ in. in diam., all strongly recurved from the first stages of

growth, about $\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, linear, acute, thick, rigid, thinly covered with rather long adpressed hairs, light greenish-grey in the dried state. Peduncles numerous, arising around the sides of the rosette from the axils of the older leaves, none central, $\frac{3}{4}$–1 in. long, filiform, terete, thinly covered with long adpressed hairs; their sheaths about $\frac{1}{4}$ in. long, obliquely truncate and slightly dilated at the mouth, ciliate, and thinly covered with long hairs. Heads about 2 lin. in diam., depressed or cushion-like, many-flowered, monœcious, brown. Involucral-bracts 5–6-seriate, ovate or ovate-lanceolate, acute or acuminate, brown, ciliate and thinly covered with long hairs at the apex, the innermost about 1 lin. long, $\frac{2}{3}$ lin. broad, the outer smaller. Flowering-bracts $\frac{3}{4}$ lin. long, $\frac{1}{8}$–$\frac{1}{6}$ lin. broad or less, linear, acute, brown, tipped with a small tuft of hairs, otherwise glabrous. Receptacle large, rather flat, spongy, densely covered with fine whitish hairs as long as the bracts and flowers. Female flowers few, in about 1 series or sometimes only 1–2 in a head, subsessile. Sepals $\frac{2}{3}$ lin. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, cuneate-obovate, obtuse, slightly concave, brown, glabrous, ciliate with short white clavate hairs, which in some flowers appear to be absent. Petals free, arising close to the sepals and very similar to them in size and shape, concave, white, hairy on the inner face, ciliate, glandless. Style with 3 bifid stigmatic branches and 3 thickened clavate appendages alternating with them. Male flowers numerous, shortly pedicellate. Sepals exactly as in the female flowers. Petals connate into a funnel-shaped tube, white, hyaline, glabrous, 3-toothed where adnate to the stamens. Anthers pallid.

Upper Guinea. Sierra Leone: without precise locality, *Borkstadt!*

This plant is very distinct from all the other African species of this Order. The sepals in the flowers of both sexes often appear to be entirely without cilia, but I am unable to determine whether the cilia have fallen away or whether only some of the flowers have ciliate sepals.

ORDER CLV. **RESTIACEÆ.** (By N. E. Brown.)

Flowers usually diœcious, rarely monœcious, very rarely hermaphrodite. Perianth-segments usually 6, in two series, sometimes 5, 4, or 3, very rarely deficient in the female flowers, glumaceous, scarious or hyaline, all similar or the inner different from the rest, 2 of the outer segments often complicate and more or less keeled. Male flowers with 3 stamens opposite the inner perianth-segments; filaments slender, free, or connate into a column in the basal part; anthers linear-oblong, 1–2-celled, dorsifixed, introrse, opening longitudinally. Pistillode rudimentary or none. Female flowers like or unlike the males. Staminodes none or 2–3 opposite the inner perianth-segments. Ovary free, sessile, or on a stout stipes, 1–3-celled; styles 1–3, free or more or less united, linear-filiform, with a plumose stigmatic surface on the inner side. Ovules solitary in each cell, orthotropous, pendulous. Fruit 1–3-celled, dry, nut-like or capsular, dehiscent or indehiscent. Seeds solitary in each cell, pendulous; testa hard or membranous,

striate, reticulate or minutely tuberculate; albumen copious, fleshy or mealy; embryo minute, lenticular or obovoid, seated in a cavity of the albumen opposite the hilum.—Perennial or rarely annual herbs of rush- or sedge-like habit, densely tufted or with a creeping rhizome, which is densely covered with coriaceous scales. Stems rigid, simple, or branched, bearing few or many convolute, persistent or deciduous sheaths, which are sometimes produced at the apex into a linear straight or curved leaf. Infloresence similar or very dissimilar in the two sexes, varying from a single terminal 1 to many-flowered spikelet, to a raceme, umbel, cyme or panicle of few or many spikelets, which are solitary or clustered in the axils of small or large and sometimes coloured sheaths (spathes of authors). Bracts imbricate, 1 or more of the lower barren, usually longer than the flowers. Bracteoles present or absent.

An order of about 300 species, mostly natives of South Africa, Australia, Tasmania and New Zealand, with 1 in Cochin China, 1 in Chili, and 1 (or 2?) in Tropical Africa.

1. **HYPOLÆNA**, R. Br.; Benth. et Hook. f. Gen. Pl. iii. 1035.

Flowers dicœcious. Male flowers: Perianth segments 6, in two series, subequal or the outer larger, two of them more or less conduplicate and keeled, glumaceous or the inner membranous. Stamens 3; filaments filiform, free; anthers linear-oblong, 1-celled, opening by one longitudinal slit. Pistillode rudimentary or none. Female flowers: Perianth segments 6, in two series, the inner membranous or hyaline. Staminodes 3, minute, or none. Ovary 1-celled, 1-ovulate; styles 2. Fruit ovoid or trigonous, 1-celled, indehiscent, sometimes thickened at the apex. Seed solitary, pendulous.—Perennial branching herbs. Sheaths closely convolute, persistent. Spikelets arranged in spikes, racemes, cymes or panicles, or solitary or clustered at the ends of the branches, often distichous, those of the male plant 1 to many-flowered, of the female 1-flowered. Bracts imbricate; bracteoles none.

A genus of several species, natives of South Africa, Australia and New Zealand, with the following from Tropical Africa.

1. **H. Mahoni,** *N. E. Br.* Stems 18–20 in. (or more?) high, branching from the base to the middle, $\frac{1}{2}$–$\frac{3}{4}$ lin. thick; branchlets rather more slender, minutely punctate or almost smooth. Sheaths 4–6 lin. long, closely convolute, obtuse, with a short terete obtuse apiculus, opaque brown, persistent. Male inflorescence a terminal spike $\frac{1}{2}$–1 in. long, composed of 2–3 distant spikelets in the axils of ovate brown sheaths 2–3 lin. long. Spikelets $2\frac{1}{2}$–3 lin long and about as much in breadth, ovate, 3–5-flowered, with a minutely scurfy-pubescent rhachis, winged by the decurrent margins of the bracts, and more or less zigzag. Bracts $1\frac{3}{4}$–$2\frac{1}{2}$ lin. long, $\frac{3}{4}$–1 lin. broad, oblong or ovate-oblong, acute or subobtuse, decurrent on the rhachis at the base, subcoriaceous, brown. Perianth-segments subequal, about 2 lin. long, $\frac{1}{3}$ lin. broad, the 3 outer linear, acute, 2 of them complicate and keeled, brown, glabrous, the three inner lanceolate, acute, thinner than the

outer, pale yellowish-brown. Stamens 3; filaments filiform, free; anthers 1 lin. long, linear-oblong, subacute. Pistillode minute, trigonous, reddish. Female inflorescence not seen.

Mozamb. Dist. British Central Africa: Nyasaland; Zomba, *Mahon!*

Besides the above, the Kew Herbarium contains a flowerless specimen collected in Nyasaland on Mount Mlanji, at 7000 ft. alt., *McClounie*, 28! It may be the same as the species above described, but the stems and branches are stouter, the sheaths 5–9 lin. long, and the plant itself appears to be of taller growth. Until flowering specimens are procured it cannot be properly determined.

ORDER CLVI. **CYPERACEÆ.** (By C. B. Clarke.)

Flowers glumaceous, 2- or 1-sexual. Perianth hypogynous, of 6 or fewer small scales or bristles, not petaloid, frequently irregular or imperfect, often 0. Stamens 3–1, free, all anterior. Ovary superior, ovoid, 1-celled; ovule 1, basal; style 1, linear (base often thickened), branches 3 or 2, or very rarely (in *Rynchospora* and a few species of *Cyperus*) very much shortened so that the style is subentire. Fruit a nut. Seed obovoid or ovoid; testa thin; embryo minute, obpyramidal, at the base of the (usually floury) albumen.—Herbs. Stems solid. Leaves narrow, grass-like, usually very tough and inedible; sheaths generally cylindric, entire, in some species of *Eriospora* split as in grasses. Flowers 1 or many in spikelets (the axis of which bearing the glumes being the rhachilla of the spikelet), which are 1- or 2-sexual, with empty glumes either at the bottom or top or both. Spikelets 1 or many or very numerous, solitary, or in clusters (such compound inflorescences usually designated spikes). Spikes or spikelets arranged in corymbs or apparently in umbels or in various ways.

Species about 3300, extending throughout the world, growing especially in damp places.

Sub-Order I. SCIRPO-SCHŒNEÆ. Fertile flowers all with perfect stamens, axillary.

TRIBE I. **Cypereæ.**—*Empty glumes at the base of the spikelets* 2 *or* 1; *fertile glumes many, few, or* 1 *to the spikelet,* 2-*ranked; hypogynous bristles* 0; *inflorescence an umbel or congested into a head; stem naked.*

Style 2-branched.

- Spikelet of 1 or 2 flowers; rhachilla deciduous . 1. KYLLINGA.
- Spikelet of several or many flowers; rhachilla persistent.
  - Nut compressed laterally . . . . . 2. PYCREUS.
  - Nut compressed dorsally . . . . . 3. JUNCELLUS.

Style 3-branched.

- Rhachilla persistent . . . . . 4. CYPERUS.
- Rhachilla deciduous in one piece.
  - Flower-glume not winged on the keel . . 5. MARISCUS.
  - Flower-glume winged on the keel . . 7. COURTOISIA.
- Rhachilla breaking up into as many joints as nuts . 6. TORULINIUM.

TRIBE II. **Scirpeæ.**—*Empty glumes at the base of the spikelets* 2–0; *fertile glumes usually numerous, spirally arranged* (*though often almost distichous in Fimbristylis, sect. Abildgaardia, and in various other species*); *inflorescence umbellate or capitate, and stem naked* (*except in Fuirena*).

Hypogynous scales 2 or 1 (not mere bristles), between the glume and the axis, anterior and posterior.
Hypogynous scales 2, thin, minute . . . . 14. LIPOCARPHA.
Hypogynous scale 1, anterior, thick, longer than the glume . . . . . 15. ASCOLEPIS.
Hypogynous scales 0, or when present not anterior and posterior.
Inflorescence paniculate, sometimes reduced to 1 or 2 heads nearly . . . . . 13. FUIRENA.
Inflorescence umbelled or in a head.
Hypogynous bristles present.
Style-base distinct from, but crowning the nut . 8. ELEOCHARIS.
Style-base confluent with the pistil and nut . 11. SCIRPUS.
Hypogynous bristles 0.
Nut elevated on a small obpyramidal disc within the stamens . . . . . 12. FICINIA.
Nut subsessile.
Style-base passing gradually into the pistil and nut . . . . . 11. SCIRPUS.
Style-base narrow-oblong, deciduous with the style . . . . . 9. FIMBRISTYLIS.
Style-base ovoid or pyramidal not falling from the nut.
Style-base large . . . . . 8. ELEOCHARIS.
Style-base minute, discoloured . . 10. BULBOSTYLIS.

TRIBE III. **Schœneæ.**—*Empty glumes at the base of the spikelet* 3 *or more; fertile flowers usually* 1 *or few* (*sometimes many*); *inflorescence panicled or capitate, not umbelled.*

Style 2-fid . . . . . 16. RYNCHOSPORA.
Style 3-fid.
Nut-bearing flower manifestly axillary, low in the spikelet.
Rhachilla of spikelet lengthened above the insertion of the lowest nut-bearing flower . . . 18. SCHŒNUS.
Rhachilla of spikelet not lengthened.
Lowest flower of the spikelet perfect, nut-bearing . . . . . 17. CARPHA.
Lowest flower of the spikelet infertile, the next nut-bearing . . . . . 20. TETRARIA.
Nut-bearing flower at the top of the spikelet, pseudo-terminal.
Plant several feet high; panicle long . . . 19. CLADIUM.
Plant a few inches high; inflorescence capitate . 21. REMIREA.

Sub-Order II. MAPANIEÆ. Spikelets with 1 terminal female nut-bearing flower: at the base of the spikelet 2 opposite boat-shaped glumes (male flowers) containing 1 stamen each; between these and the pistil (which has no perianth) are 1, 0 or several glumes spirally imbricate which are empty or the lower male.—Spikelets very small, imbricated in spikes themselves simulating the spikelets of large *Scirpeæ*. Inflorescence more or less scapose.

Inflorescence umbelled . . . . . 22. HYPOLYTRUM.
Inflorescence capitate . . . . . 23. MAPANIA.

Sub-Order III. CARICEÆ. Fertile flowers without stamens. Inflorescence panicled or capitate, not umbelled. Spikelet with but 1 female flower.

Nut not enclosed in a utricle.
  Nut surrounded at the base by numerous hairs or bristles . . . . . 26. ERIOSPORA.
  Nut without hairs at the base.
    Nut-bearing spikelet containing male flowers or rudiments . . . . . 24. SCLERIA.
    Nut-bearing spikelet female, the flower pseudo-terminal . . . . . 25. DIPLACRUM.
Nut enclosed in a utricle, *i.e.*, the 2 prophylla (bracteoles) connate into a bottle-shaped body . . 27. CAREX.

1. **KYLLINGA,** Rottb. partly; Benth. et Hook. f. Gen. Pl. iii. 1045.

Spikes ovoid or cylindric, dense, with many small compressed spikelets. Spikelets of 4–7 distichous glumes, 1–6-flowered; lowest (or several lowest) flower 2-sexual, perfecting a nut; uppermost flower sterile or uppermost glume empty; 2 lowest glumes smaller, empty; rhachilla in fruit falling off by disarticulation from a cushion below the lowest fertile flower. Stamens 1–3, anterior; anthers narrow oblong, not crested. Style not bulbous at the base; branches 2, linear, in a plane passing through the rhachilla. Nut oblong or ellipsoid, compressed laterally, smooth.—Glabrous. Leaves all close to the base of the nodeless stem, green and long (except in *K. pungens* and *K. peruviana*). Inflorescence a head of 3–1 (very rarely 4–5) absolutely sessile spikes, subtended by 3–6 leaf-like bracts. When the spikes are 3, the middle one is often much longer than the others.

Species 45, in all hot and temperate regions except Europe. A specially African genus.

*THRYOCEPHALUM.—Keel of nut-bearing glume winged in fruit; spikelets perfecting 1 (rarely 2) nut.
  Rhizome less than $\frac{1}{2}$ in. long, usually 0.
    Spikelets $\frac{1}{3}$ in. long, in a head $\frac{1}{4}$–$\frac{1}{3}$ in. in diam.
      Wing of nut-bearing glume very strong, with conic teeth . . . . . 1. *K. squamulata.*
      Wing of nut-bearing glume narrow, ciliate . 2. *K. controversa.*
    Spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. long, in a head $\frac{1}{2}$ in. in diam.
      Head even in fruit very white; spikelets spreading . . . . . 3. *K. alba.*
      Head pale dusky-cinnamon-coloured; spikelets erect . . . . . 4. *K. nigritana.*
  Rhizome creeping, 3–10 in. long . . . . 5. *K. monocephala.*

**EUKYLLINGA.—Keel of nut-bearing glume not winged; spikelets perfecting 1 (rarely 2) nut.
  Rhizome creeping, often flexuose; bracts rarely more than 3; head generally of one spike only.
    Spike of 6–12 lanceolate spikelets . . . 7. *K. pauciflora.*
    Spike of very many spikelets.
      Head green, ultimately dull brown . . 6. *K. brevifolia.*
      Head more or less golden-tinged . . . 8. *K. erecta.*

Head white cinnamon-coloured . . . 9. *K. sphaerocephala.*
Rhizome horizontal, thick, not very long. Stouter species than in the other groups.
Leaves long; bracts long, more than 3 (except in *K. melanosperma*).
Stem terete at the top . . . . . 13. *K. teres.*
Stem triquetrous at the top.
Middle spike shortly cylindric.
Spikes 1–3 (usually 1 only) . . . 11. *K. elatior.*
Spikes 5 . . . . . 14. *K. senegalensis.*
Middle spike ovoid or depressed.
Bracts 3–4 . . . . . 15. *K. melanosperma.*
Bracts 5–8.
Stems 4–8 in. long, rather slender . 10. *K. crassipes.*
Stems 10–20 in. long, robust . . 12. *K. polyphylla.*
Leaves and bracts short, usually very short or 0.
Bracts 4 or 5 . . . . . 16. *K. pungens.*
Bracts 2 or 3 . . . . . 17. *K. peruviana.*
Rhizome 0 or very short; stem appearing bulbous at the base, thickened by leaf-sheaths. Plants and spikelets small (or medium-sized in *K. nervosa*).
Head of 1 spike only.
Nut-bearing glume not strongly nerved.
Spike $\frac{1}{4}$–$\frac{1}{6}$ in. in diam.; rhizome 0 . . 18. *K. chlorotropis.*
Spikes $\frac{1}{8}$–$\frac{1}{6}$ in. in diam. . . . . 19. *K. parvula.*
Spike $\frac{1}{4}$ in. in diam.; rhizome delicate . 20. *K. bracheilema.*
Nut-bearing glume chestnut, with 4 yellow nerves on each side . . . . 21. *K. nervosa.*
Head of 3–1 spikes, usually 3.
Spike $\frac{1}{5}$–$\frac{1}{3}$ in. long . . . . . 22. *K. triceps.*
Spike $\frac{1}{6}$ in. long at most . . . . 23. *K. microstyla.*
Rhizome 0 or very small; stems not bulbous at the base.
Head of 1 dense long-cylindric yellow spike; glumes mucronate . . . . . 24. *K. flava.*
Head of 3–1 green or white spikes; nut-bearing glume muticous.
Spikelets $\frac{1}{12}$–$\frac{1}{8}$ in. long; nut-bearing glume scabrous on the keel . . . . 25. *K. pumila.*
Spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. long; nut-bearing glume smooth on the keel . . . . 26. *K. cylindrica.*

***PSEUDO-PYCREUS.—Keel of nut-bearing glume not winged; spikelets usually perfecting 2 or more nuts.
Spikelets often perfecting 2 nuts, rarely more.
Stems hardly thickened at the base.
Heads tinged golden or yellow.
Middle spike cylindric, slightly tinged yellow 27. *K. ruwenzoriensis.*
Middle spike ovoid, golden . . . . 28. *K. chrysantha.*
Heads chestnut with green points to the glumes . . . . . 29. *K. pulchella.*
Heads straw-coloured or very pale brown.
Spike oblong . . . . . 30. *K. oblonga.*
Spike subglobose . . . . . 32. *K. Buchanani.*

Stems thickened at the base.
Thickened base of stem oblong.
Basal leaf-sheaths torn, brown . . . 31. *K. bulbocaulis.*
Basal leaf-sheaths torn, black . . . 33. *K. nigripes.*
Thickened base of stem ovoid, bulbous . . 34. *K. exigua.*
Spikelets several-flowered, often maturing more than 2 nuts.
Stems tufted in a bed of fibrous remains of leaf-sheaths . . . . . 37. *K. leucocephala.*
Basal leaf-sheaths not fimbriate into fibres.
Spikelets $\frac{1}{6}$ in. long . . . . . 35. *K. albiceps.*
Spikelets $\frac{1}{5}$ in. long; spike less than $\frac{1}{2}$ in. in diam. . . . . 36. *K. macrocephala.*
Spikelets $\frac{1}{5}$–$\frac{1}{3}$ in. long; spike more than $\frac{1}{2}$ in. in diam. . . . . 38. *K. eximia.*

1. **K. squamulata,** *Vahl, Enum.* ii. 381. Root fibrous. Stems closely cæspitose. Leaves often as long as the stem, $\frac{1}{8}$ in. broad. Head globose, usually of 1 spike, $\frac{1}{3}$ in. in diam., green becoming brown; bracts 3, lowest often 4 in. long, similar to the leaves, patent. Spikelets numerous, $\frac{1}{8}$ in. long, perfecting 1 nut. Nut-bearing glume crested by toothed scales coalescent into a wing on its keel. Nut $\frac{2}{3}$ the length of the glume, orbicular, dull-brown.—Schumach. & Thonn. Beskr. Guin. Pl. 41; Boeck. in Linnæa, xxxv. 431, and in Flora, 1879, 515; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 147; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 589, and in Durand & Schinz, Conspect. Fl. Afr. v. 532, and Études Fl. Congo, i. 280; Urban, Symb. Antill. ii. 10, 11; Rendle in Cat. Afr. Pl. Welw. ii. 105. *K. dipsacoides*, Schumach. & Thonn. Beskr. Guin. Pl. 41. *K. cristata*, Afzel. Remed. Guin. 71; A. Rich. Tent. Fl. Abyss. ii. 493, not of Kunth (cfr. C. A. Meyer in Mém. Sav. Étrang. St. Pétersb. i. [1831] 205). *K. squamulosa*, Kunth, Enum. ii. 135. *K. dentata*, Hochst. ex Steud. Syn. Pl. Glum. ii. 70. *K. squamata*, Vahl ex Boeck. in Linnæa, xxxv. 431. *K. monocephala*, Zarb, in Cat. Spéc. Bot. Pfund, 39, not of Rottb.

Upper Guinea. Guinea, *Thonning!* Senegal, *Perrottet*, 867! *Lécard*, 155! Sierra Leone: between Freetown and Sugarloaf Mountain, *Welwitsch*, 6987! and without precise locality, *Smeathman!* Niger Territory: Nupe, *Baikie!*

Nile Land. Kordofan: Obeid, *Pfund*, 45! Gebel Kurbag, *Pfund*, 616! and without precise locality, *Colston*, 283! Galabat: region of Matamma, *Schweinfurth*, 2052! Abyssinia: near Jelajeranne, *Schimper*, 1457! Begemeder, *Schimper*, 89! and without precise locality, *Schimper*, 1733! *Quartin-Dillon*, 23! British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2333!

Lower Guinea. Lower Congo: Lutete, 2000 ft., *Hens*, A, 292!

Also in North India and Martinique.

2. **K. controversa,** *Steud. Syn. Pl. Glum.* ii. 70. Roots fibrous, or root-stock thick and less than $\frac{1}{3}$ in. long. Stems closely cæspitose, somewhat thickened at the base. Leaves often as long as the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Head globose, of 1 spike, $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., pale brown when dry; bracts 3–4, lowest often 3–6 in. long, similar to the leaves, suberect at the base. Spikelets numerous, $\frac{1}{8}$ in. long, each perfecting

1 nut. Nut-bearing glume acuminate, strongly winged on the keel, wing ciliate. Nut $\frac{1}{2}$ the length of the glume, obovoid, brown becoming black.—Boeck. in Linnæa, xxxv. 429; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 527. *K. alba*, Steud. in Flora, 1842, 597; A. Rich. Tent. Fl. Abyss. ii. 494; not of Nees. *K. monocephala*, Hochst. in Flora, 1844, 102; not of Rottb. *K. cæspitosa*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 145 partly. *K. triceps*, Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 49, not of Vahl. *K. dorsocrena*, Nees ex Boeck. in Linnæa, xxxv. 430.

Upper Guinea. Cameroons: at the edge of the River Lobe, near Batanga, *Bates*, 143!

Nile Land. Eritrea: Mogod Valley, 4500 ft., *Schweinfurth & Riva*, 1580! Abyssinia: Tigre; Hamedo, 6000 ft., *Schimper*, 856! hills near Enderder, *Schimper*, 581! and without precise locality, *Schimper*, 296! 836! *Quartin-Dillon & Petit!*

Lower Guinea. Angola: Pungo Andongo; in damp forest-meadows between Bumba and Condo, 3300 ft., *Welwitsch*, 6798! Muta Lucala, *Welwitsch*, 6790 partly! between Lombe and Muta Lucala, *Welwitsch*, 6796 partly!

Mozamb. Dist. Portuguese East Africa; near Lupata, *Kirk!*

Var. *subexalata*, C. B. Clarke. Spikes usually 3 to the head. Wing on the keel of the nut-bearing glume narrow. Sheaths of the leaves much torn.—*K. triceps*, var. *β ciliata*, Boeck. in Peters, Reise Mossamb. Bot. 535, in Linnæa, xxxv. 414, and in Flora, 1879, 515 partly; Schweinf. Beitr. Fl. Aethiop. 216; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 533 partly. *K. cæspitosa*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 145 partly. *K. blepharinota*, Hochst. ex Boeck. in Linnæa, xxxv. 414.

Upper Guinea. Senegambia, *Heudelot*, 399! Niger Territory: Nupe, *Barter*, 1588!

Nile Land. Kordofan: Gebel Kurbag, *Pfund*, 359! 623! Abyssinia: sandy places by the River Tacazze, near Gursarfa, 3000–4000 ft., *Schimper*, 2201! and without precise locality, *Hildebrandt*, 360!

This variety has been brought hither from *K. triceps*, principally because the spikes and florets are too large for that species.

3. **K. alba,** *Nees in Linnæa*, x. 140. Roots fibrous, or rhizome very short. Stems cæspitose, 8–24 in. long, sometimes minutely scabrous (scarcely hairy) under the bracts. Leaves often as long as the stem, $\frac{1}{8}$–$\frac{1}{5}$ in. broad. Head globose, of 1 spike, $\frac{1}{2}$ in. in diam., white even in fruit; bracts 3–4, lowest often 3–8 in. long, similar to the leaves, patent, finally pendent. Spikelets numerous, $\frac{1}{6}$ in. long, each perfecting 1 nut. Nut-bearing glume having a wing (though often but narrow) on the keel, frequently crested. Nut $\frac{1}{2}$ the length of the glume, ellipsoid, chestnut-coloured.—Kunth, Enum. ii. 136; Boeck. in Linnæa, xxxv. 430; Ficalho & Hiern in Trans. Linn. Soc. ser. 2, Bot. ii. 26; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 147; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 526 (excl. Barter, 1588), in Bull. Herb. Boiss. iv. Append. iii. 28, and in Dyer, Fl. Cap. vii. 151; Engl. Hochgebirgsfl. Trop. Afr. 146; K. Schum. in Engl. Pfl. Ost-Afr. C. 123;

Rendle in Cat. Afr. Pl. Welw. ii. 105. *K. cristata*, Kunth, Enum. ii. 136. *K. cartilaginea*, K. Schum. in Engl. Pfl. Ost-Afr. C. 123.

Nile Land. British East Africa: Rabai Hills, near Mombasa, *Taylor!*

Lower Guinea. Angola: Huilla; 5000 ft., in the drier pastures of Empalanca, *Welwitsch*, 6805! in the high pastures of Morro de Monino, *Welwitsch*, 6806! in the drier thicket-grown pastures of Catumba, *Welwitsch*, 6812! German South-west Africa: Amboland, *Schinz*, 364! Damaraland, *Een*, Hereroland, Dinter, 487!

Mozamb. Dist. Zanzibar, *Boivin!* German East Africa: Usambara; Tanga, *Holst*, 2082! Unyamwezi; Uyui, *Taylor!* Portuguese East Africa: Mozambique, *Zimmermann!* Zambesi Delta; mouth of the Kongone River, *Kirk!* Lower Zambesi; between Lupata and Tete, *Kirk!* near Morambala Mountain, *Kirk!* British Central Africa: banks of the Zambesi, *Holub!* Upper Zambesi, *Ficalho! Livingstone!* Ngamiland; Kwebe Hills, *Lugard*, 67! Nyasaland; near Zomba, 2500–3500 ft., *Whyte!*

Common in South Africa.

Var. β *alata*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 526, in Bull. Herb. Boiss. iv. Append. iii. 28, and in Dyer, Fl. Cap. vii. 151. Stem scabrous hairy under the bracts. Heads greenish-golden. Nut-bearing glume with a broad wing on keel, crested.—*K. alata*, Nees in Linnæa, ix. 286; Kunth, Enum. ii. 136; Boeck. in Linnæa, xxxv. 430.

Lower Guinea. German South-west Africa: Hereroland, *Fleck*, 164A! Amboland, *Nels*, 14! *Schinz*, 365, 366!

Common in South Africa.

4. **K. nigritana,** *C. B. Clarke.* Roots fibrous. Stems cæspitose, 7–10 in. long. Leaves somewhat shorter than the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Head globose, of 1 spike, $\frac{1}{2}$ in. in diam., pale cinnamon-coloured; bracts 3–4, lowest 2–3 in. long, resembling the leaves, suberect, obscurely dilated saccate at the base. Spikelets numerous, $\frac{1}{6}$–$\frac{1}{5}$ in. long, broadly ovate, strongly compressed, in fruit erect (not stellately spreading as in *K. alba*), each perfecting 1 nut. Nut-bearing glume with a broad wing on the keel. Nut $\frac{1}{2}$ as long as the glume, brown when ripe.

Upper Guinea. Niger Territory: Nupe, *Barter!*

Lower Guinea. Lower Congo: Kimuenza, *Gillet*, 1624!

5. **K. monocephala,** *Rottb. Descr. et Ic.* 13, *t.* 4, *fig.* 4, *excl. certain syns.* Rhizome creeping, often 4–10 in. long. Stems distant or contiguous. Leaves often as long as the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Head of 3–1 green or green-white spikes, the middle one ovoid $\frac{1}{5}$–$\frac{1}{3}$ in. in diam.; bracts 3, lowest 2–5 in. long, resembling the leaves, patent. Spikelets numerous, $\frac{1}{10}$–$\frac{1}{8}$ in. long, each perfecting 1 nut. Nut-bearing glume broadly-winged on the upper part of the keel; wing gland-dotted. Nut $\frac{1}{2}$ as long as glume, obovoid, yellow finally brown.—Linn. f. Suppl. 104; Vahl, Enum. ii. 379; Kunth, Enum. ii. 129; Boeck. in Linnæa, xxxv. 427; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 147; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 588, and in Durand & Schinz, Conspect. Fl. Afr. v. 530; K. Schum. in Engl. Pfl. Ost-Afr. C. 123; Rendle in Cat. Afr. Pl. Welw. ii. 105.

Lower Guinea. Princes Island; *Welwitsch*, 6988!

Mozamb. Dist. Portuguese East Africa: Between Shire River and Shupanga, *Stewart!*

Very general in the warmer parts of the Old World, especially near the sea.

This plant is frequent in the Mascarene Isles, but only known in Africa by the two examples above cited, which may easily have been introduced. From the New World two examples only have been seen, one from Bahia, the other from Buenos Ayres.

6. **K. brevifolia,** *Rottb. Descr. et Ic.* 13, *t.* 4, *fig.* 3. Rhizome creeping, 2–8 in. long, rarely more than $\frac{1}{12}$ in. thick. Stems usually distant, sometimes contiguous, not thickened by basal sheaths. Leaves longer than the stem or scarcely $\frac{1}{3}$ its length, $\frac{1}{8}$ in. broad. Head of 1 (sometimes of 2–3) spike rarely more than $\frac{1}{4}$ in. in diam., ovoid, of many spikelets, green finally dusky brown; bracts 3–4, similar to the leaves, lowest up to 4–5 in. long, or (in the short-leaved examples) only 1–2 in. long, patent. Spikelets $\frac{1}{10}$ in. long, each perfecting 1 nut. Nut-bearing glume acute, mostly without glands; keel not winged, nearly always scabrous. Nut $\frac{1}{2}$–$\frac{2}{3}$ the length of the glume, yellow-brown.—Vahl, Enum. ii. 380; Kunth, Enum. ii. 130; Boeck. in Linnæa, xxxv. 424 (excl. some plants cited), and in Flora, 1881, 79; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 588, and in Durand & Schinz, Conspect. Fl. Afr. v. 527 (excl. Welwitsch, 6781); Urban, Symb. Antill. ii. 11; Durand & Schinz, Études Fl. Congo, i. 277? *Schœnus coloratus,* Linn. Sp. Pl. ed. 2, 64.

Upper Guinea. Niger Territory: Old Calabar, *Robb!* Niger Expedition, without precise locality, *Vogel,* 37!

Lower Guinea. Lower Congo: Stanley Pool, *Buettner,* 11 (ex *Durand & Schinz*); Sicia, *Dupuis,* 21 (ex *Durand & Schinz*).

Abundant throughout the hot regions of the world, but very scarce in Continental Africa.

K. Schumann (in Engl. Pfl. Ost-Afr. C. 123) records *K. brevifolia,* Rottb. from five of his regions (including Cameroons, Gaboon, Niamniam, and Zanzibar). How far this distribution is founded on plants that I have not seen, or how far it is compiled from collections wrongly named *brevifolia* that I have seen, I am altogether in doubt.

7. **K. pauciflora,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 147, *t.* 23, *fig.* 1–4. Rhizome horizontal. Stems approximate, 4–20 in. long, acutely triquetrous at the top. Head of 1 spike, $\frac{1}{4}$ in. in diam., ovoid, of 6–12 spikelets, when young sometimes golden-tinged; bracts 3, lowest up to 5 in. long, similar to the leaves. Spikelets lanceolate, $\frac{1}{8}$ in. long, each perfecting 1 nut. Nut-bearing glume lanceolate, acute; keel smooth, without wing.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 530, and in Dyer, Fl. Cap. vii. 152; Rendle in Cat. Afr. Pl. Welw. ii. 105.

Lower Guinea. Angola: Huilla, 5000 ft., *Welwitsch,* 6811!

Also in Natal.

This very critical species comes between *K. brevifolia* and *K. erecta,* themselves hardly separable: it differs from both in the longer, elongate-lanceolate, glumes; the small number of spikelets may be accidental.

8. **K. erecta,** *Schumach. & Thonn. Beskr. Guin. Pl.* 42. Rhizome creeping, sometimes 4–8 in. long, $\frac{1}{10}$–$\frac{1}{8}$ in. in diam., with distant stems; sometimes only 1–3 in. long, thicker, with contiguous (often uniseriate) stems. Leaves often $\frac{1}{2}$ the length of the stem, $\frac{1}{8}$ in. broad. Head of 1 spike, $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., ovoid, dense, very commonly (especially when young) showing a golden tinge; bracts 3–4, lowest 1–3 in. long, similar to the leaves, patent. Spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. long, each perfecting 1 nut. Nut-bearing glume without a wing, usually not scabrous on the keel. Nut $\frac{1}{2}$ the length of glume, ellipsoid, yellow-brown finally nearly black.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 528, and in Dyer, Fl. Cap. vii. 152; K. Schum. in Engl. Pfl. Ost-Afr. C. 123; Durand & Schinz, Études Fl. Congo, i. 278; Rendle in Cat. Afr. Pl. Welw. ii. 105. *K. aurata,* Nees in Linnæa, x. 139 (excl. Nees' citation of himself in Linnæa, vii. 512), ? Nees in Linnæa, ix. 286; Kunth, Enum. ii. 137 partly; Boeck. in Linnæa, xxxv. 422, excl. var. γ; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 146; Engl. Hochgebirgsfl. Trop. Afr. 146; K. Schum. in Engl. Pfl. Ost-Afr. C. 123; Volk. Kilimand. 285. *K. consanguinea,* Kunth, Enum. ii. 135. *K. polyphylla,* Benth. in Hook. Niger Fl. 552 mainly, not of Willd. *K. monocephala,* Benth. in Hook. Niger Fl. 552 mainly, not of Rottb. *K. Sojauxii,* Boeck. in Flora, 1879, 515.

Upper Guinea. Sierra Leone: Falaba, *Scott-Elliot,* 5187B! Liberia: Bassa Cove, *Ansell!* Gold Coast: Cape Coast Castle, *Don!* Guinea, *Thonning!* Niger Territory: Nupe, *Barter,* 1589!

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth,* 2033! Ruwenzori, 5000–7000 ft., *Scott-Elliot,* 7561! Rabai Hills, near Mombasa, *Taylor!*

Lower Guinea. Loango: Chinchocho, *Soyaux,* 175! Mouth of the Congo, *Smith! Duchesne,* 185! Lower Congo, *Hens,* 59, 134! Angola: Pungo Andongo; 3500 ft., around Lagoa de Quibinda, *Welwitsch,* 6800! in damp thickets near Luxillo, *Welwitsch,* 6808! Huilla; near Lopollo, 5000 ft., *Welwitsch,* 6809! in meadows by the River Cacolobar, *Welwitsch,* 6810! Loando, 800 ft.; around ponds near Repressa de Luiz Gomes, *Welwitsch,* 6797! 6999! Dande; by Lake Bombo, *Welwitsch,* 6799! Benguella; by the River Caculovar, *Newton,* 3!

South Central. Congo Free State: Monbuttu; by the Kibali River, *Schweinfurth,* 3541!

Mozamb. Dist. German East Africa: Kilimanjaro; at Marangu, 4900 ft., *Volkens,* 239! 1396! 2102! Karagwe; Bukoba, *Stuhlmann,* 3304! Unyamwezi; Uyui, *Taylor!* British Central Africa: Nyasaland; Zomba, 2500–6000 ft., *Whyte!* near Nsessi River, *Scott!*

Abundant also in South Africa and the Mascarene Islands.

Any example in which the head has a golden tinge has been usually referred to this species, but it is not a safe character, and the Indian plant referred here by Boeckler is *K. brevifolia.*

9. **K. sphærocephala,** *Boeck. in Flora,* 1875, 258. Rhizome creeping, hardly $\frac{1}{12}$ in. in diam. Stems 1 ft. long, slender, not thickened at the base by sheaths. Leaves $\frac{1}{2}$–$\frac{2}{3}$ the length of the stem, $\frac{1}{10}$–$\frac{1}{8}$ in. broad. Head of 1 spike, $\frac{1}{4}$ in. in diam., globose, dense, pale cinnamon colour; bracts 2–3, lowest 2 in. long, $\frac{1}{20}$ in. broad, patent. Spikelets

$\frac{1}{8}$ in. long, each perfecting 1 nut. Nut-bearing glume ovate-oblong, without a wing on the keel, in the type plant 4-ribbed without glands. Nut $\frac{1}{2}$ the length of glume, ellipsoid, yellow-brown.—Oliver in Trans. Linn. Soc. xxix. 166; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 532 (excl. var. γ); K. Schum. in Engl. Pfl. Ost-Afr. C. 123, *K.? alba*, T. Thoms. in Speke, Nile, Append. 654 partly.

Nile Land. British East Africa: Unyoro, *Speke & Grant!*

Var. *glandulosa*, C. B. Clarke. Nut-bearing glume full of conspicuous round red oil-glands.

Lower Guinea. Angola: Humpata, *Newton*, 1!

Further material may show this to be a distinct species. Of the var. *brunnescens* (now excluded) I have since seen a piece showing well the rhizome, and describe it below as *K. senegalensis*.

10. **K. crassipes,** *Boeck. in Flora*, 1859, 444. Rhizome horizontal, seen $\frac{2}{3}$ in. long. Stems 4–8 in. long, contiguous, somewhat thickened by basal leaf-sheaths. Leaves rather longer than stem, $\frac{1}{12}$ in. broad. Head of 1–3 spikes, pale brown; middle spike ovoid, $\frac{1}{4}$ in. in diam.; bracts 4–5, very long, lowest often longer than the stem, similar to the leaves. Spikelets $\frac{1}{8}$ in. long, perfecting 1 nut. Nut-bearing glume smooth on the keel, without a wing, with sunk round red glands.—Boeck. in Peters, Reise Mossamb. Bot. 534, and in Linnæa, xxxv. 426; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 527; K. Schum. in Engl. Pfl. Ost-Afr. C. 123.

Nile Land. Atwot district, between Jemed and the River Rohl, *Petherick!*

Mozamb. Dist. Zanzibar, *Peters!* and Mozambique Island, *Peters.*

This species is slenderer than the others in this group.

11. **K. elatior,** *Kunth, Enum.* ii. 135. Rhizome obliquely descending, thick. Stems 16–24 in. long, thick, acutely triquetrous at the top. Leaves sometimes nearly as long as the stem, more often abbreviated (the uppermost 2–4 in. long), $\frac{1}{6}$–$\frac{1}{4}$ in. broad. Head of 3–1 (usually 1) spikes, middle one cylindric, up to $\frac{1}{2}$–$\frac{2}{3}$ in. long by $\frac{1}{4}$–$\frac{1}{3}$ in. broad, of very many horizontal dirty-white spikelets; bracts 5–6, very long, lowest 4–8 in. long, $\frac{1}{5}$ in. broad. Spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. long, each perfecting 1 (or rarely 2) nut. Nut-bearing glume smooth on the wingless keel. Nut less than $\frac{1}{2}$ the length of the glume, obovoid, brown or black.—Krauss in Flora, 1845, 757; Boeck. in Linnæa, xxxv. 422; Ridley in Journ. Linn. Soc. xx. 334?; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 528 (excl. syn. *K. aromatica*, Ridley), and in Dyer, Fl. Cap. vii. 153; K. Schum. in Engl. Pfl. Ost-Afr. C. 123; Durand & Schinz, Études Fl. Congo, i. 278.

Lower Guinea. Lower Congo: Matadi, *Heus*, 31 (ex *Durand & Schinz*).

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan!* Plains of Zomba, 2500–3000 ft., *Whyte!*

South-east Trop. Africa; and ? Madagascar.

There is very little to distinguish this species from *K. polyphylla*, Kunth, and *K. melanosperma*, Nees, but the cylindric middle-spike. I have moved all the Angola examples (*K. aromatica*, Ridley), which I formerly called *K. elatior*, into *K. polyphylla*.

12. **K. polyphylla,** *Willd. ex Kunth, Enum.* ii. 134. Rhizome horizontal or obliquely descending, short, thick. Stems 10–20 in. long, triquetrous at the top. Leaves usually short, sometimes $\frac{1}{6}$–$\frac{2}{3}$ the length of the stem, $\frac{1}{6}$–$\frac{1}{5}$ in. broad. Head of 3–1 (usually 1) spikes; bracts 5–8, lowest usually exceeding 4 in. long, similar to the leaves. Spikes ovoid, $\frac{1}{3}$ in. or more in diam., dense, green usually tinged with orange or brown. Spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. long, lanceolate, each perfecting 1 nut. Nut-bearing glume scabrous, wingless on the keel, which is subexcurrent into a mucro. Nut less than $\frac{1}{2}$ the length of the glume, obovoid, finally chestnut-coloured.—Boeck. in Linnæa, xxxv. 409; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 531; K. Schum. in Engl. Pfl. Ost-Afr. C. 123. *K. elata*, Boeck. in Linnæa, xxxv. 420, not of Steud. *K. macrantha*, Boeck. in Linnæa, xxxv. 420. *K. aromatica*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 146. *K. planiceps*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 531; Durand & Schinz, Études Fl. Congo, i. 279. *K. elatior*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 528 partly; Rendle in Cat. Afr. Pl. Welw. ii. 104.

Nile Land. British East Africa: Rabai Hills, near Mombasa, *Taylor!*

Lower Guinea. Mouth of the Congo, *Smith!* Angola: Pungo Andongo; in fissures of rocks on the stream Malemba, near Candumba, 3500 ft., *Welwitsch*, 6801! Golungo Alto; near Banza de Bango, *Welwitsch*, 7007! Loanda, 1000 ft., *Welwitsch*, 6996!

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1065! *Boivin!* German East Africa: Usaramo; Dar es Salaam, *Kuntze*, 212! Usambara: Sega (Magila), *Volkens* 66!

Abundant in the Mascarene Islands.

This species hardly differs from *K. melanosperma* but by the more numerous bracts. As to *K. elata*, Steud. (Syn. Pl. Glum. ii. 70, not of Boeck.), the example of Boivin, 1676, named *elata* by Steudel's hand in his own herbarium, is *Mariscus dregeanus*, Kunth.

13. **K. teres,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 533. Stems 20 in. long, at the apex $\frac{1}{8}$–$\frac{1}{6}$ in. in diam., cylindric, scarcely at all trigonous. Leaves short. Head of 1 spike, ovoid, exceeding $\frac{1}{3}$ in. in length; bracts 6–10, up to 6 in. long, more than $\frac{1}{4}$ in. broad. Otherwise as *K. polyphylla*.—Durand & Schinz, Études Fl. Congo, i. 280; Durand & De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 88.

South Central. Congo Free State: Bangala, *Demeuse*, 336! Romee *Laurent!* Stanleyville, *Duchesne*, 9!

This might be treated as a variety of *K. polyphylla*, Kunth, which it is closely allied to in all respects. But *K. polyphylla* has the stem sharply triquetrous at the top, without any approach to the terete stem of *K. teres*.

14. **K. senegalensis,** *C. B. Clarke.* Rhizome short, thick. Stem 18 in. long. Leaves 8 in. long, $\frac{1}{8}$ in. broad. Head of 5 spikes; bracts 4–5, patent, lowest 3 in. long. Spikes short-cylindric, $\frac{1}{3}$ in. long, $\frac{1}{4}$ in. broad, dense with spikelets spreading horizontally. Spikelets small, scarcely $\frac{1}{10}$ in. long, narrowly oblong, each producing 1 nut. Nut-

bearing glume without glands; keel wingless, scabrous. Nut $\frac{1}{2}$–$\frac{2}{3}$ the length of the glume, oblong, finally black.—*K. sphærocephala*, var. *brunnescens*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 532.

Upper Guinea. Upper Senegal, *Lécard*, 215.

The short thick rhizome, as well as the 5 cylindric heads, negative this plant being arranged under *K. sphærocephala*, Boeck.

15. **K. melanosperma,** *Nees in Linnæa*, ix. 286. Rhizome thick, $\frac{1}{2}$–$1\frac{1}{2}$ in. long. Stems 20–30 in. long, triquetrous under the inflorescence. Leaves much shorter than the stems, often 4–6 in. long, $\frac{1}{6}$–$\frac{1}{5}$ in. broad. Head of 1 spike, ovoid, dull green, $\frac{1}{3}$ in. long and more; bracts 3–4, similar to the leaves, the lowest often 4 in. long. Spikelets numerous, $\frac{1}{8}$–$\frac{1}{6}$ in. long, each producing 1 (very rarely 2) nut. Nut-bearing glume ovate, acute; keel not winged, almost smooth. Nut $\frac{1}{2}$–$\frac{2}{3}$ the length of the glume, narrowly obovoid, finally black.—Nees in Wight, Contrib. 91; Boeck. in Linnæa, xxxv. 419; Oliver in Trans. Linn. Soc. xxix. 166; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 588, in Durand & Schinz, Conspect. Fl. Afr. v. 529, and in Dyer, Fl. Cap. vii. 153; K. Schum. in Engl. Pfl. Ost-Afr. C. 123. *K. macrocephala*, T. Thoms. in Speke, Nile, Append. 654, not of A. Rich.

Nile Land. British East Africa: Madi, *Speke & Grant*, 693!

Lower Guinea. Lower Congo: Bingila, *Dupuis!*

South Central. Congo Free State: Lusambo, on the Sankuru River, *Duchesne*, 11! 23!

Mozamb. Dist. Zanzibar, *Stuhlmann*, 93! British Central Africa: Nyasaland; Plains of Zomba, 2500–3000 ft., *Whyte!* Namasi, near Zomba, *Cameron*, 89!

Also in South Africa, Madagascar, India and Malaya.

The plants with the ticket "Stuhlmann, 93," are by some error in distribution marked *Rhyncospora echinophora*, K. Schum.; but I have not found where that *Rhyncospora* is published. In Cameron, 89, the stems exceed 5 ft. in height; the heads are young and I do not see how they differ from young heads of *K. melanosperma*.

16. **K. pungens,** *Link, Hort. Berol.* i. 326. Rhizome horizontal, thick, closely covered by ovate rigid brown scales. Stems 8–18 in. long, rather stout, contiguous and uniseriate on the rhizome. Leaves $\frac{1}{8}$–$\frac{1}{6}$ in. broad, less than $\frac{1}{2}$ the length of the stem, often quite short. Head of 1 spike, $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., dense, subglobose; bracts generally 4, sometimes 5, 1–4 in. long, similar to the leaves. Spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. long, each perfecting 1 nut. Keel of the nut-bearing glume slightly scabrous, not winged. Nut scarcely $\frac{1}{2}$ the length of the glume, finally black.—Kunth, Enum. ii. 128; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 532; K. Schum. in Engl. Pfl. Ost-Afr. C. 123; Urban, Symb. Antill. ii. 12; Rendle in Cat. Afr. Pl. Welw. ii. 104. *K. obtusata*, Presl, Rel. Haenk. i. 183; Kunth, Enum. ii. 128; Boeck. in Linnæa, xxxv. 418; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 146. *K. brevifolia*, Boeck. in Linnæa, xxxv. 425 (as to Barter 1586 only).

and in Flora, 1879, 515; K. Schum. in Engl. Pfl. Ost-Afr. C. 123 partly.

Upper Guinea. Niger Territory: Nupe, *Barter*, 1586!

Nile Land. British East Africa: Bongo; by the Matju River, *Schweinfurth*, 4032!

Lower Guinea. Gaboon: near the Ogowe River, *Soyaux*, 285! Congo Free State: Kisantu, on the Inkissi River, *Gillet*, 1010! 1022! Angola: Pungo Andongo; in wet places on the Calemba Islands, in the River Cuanza, near Condo, *Welwitsch*, 6800 partly!

Mozamb. Dist. German East Africa: Unyamwezi; Uyui, *Taylor!* British Central Africa: Nyasaland; Karonga, *Scott!*

Abundant in South America; very rare in China and Malaya.

The African specimens of this plant have been marked repeatedly *K. brevifolia* by Boeckeler, and authors have published accordingly. It differs much from *K. brevifolia* in the rhizome, which is much thicker, with crowded uniseriate stems and imbricated one-sided almost horny scales. It has also very constantly, 4 equal subverticillate bracts (with sometimes a fifth small one added), whereas in *K. brevifolia* the bracts are 3, and the lowest much the longest.

17. **K. peruviana,** *Lam. Encycl.* iii. 366. Rhizome horizontal, thick, closely covered by ovate rigid brown scales. Stems 12–20 in. long, stout, contiguous and uniseriate on the rhizome. Leaves in the typical state hardly any, but the barren shoots often have leaves, and on some of the flowering stems the uppermost leaf is 8–12 in. long and $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Head of 1 spike, globose, $\frac{1}{3}$ in. in diam., dense; bracts 3, rarely exceeding 1 in. long. Spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. long, each perfecting 1 nut. Keel of nut-bearing glume wingless, smooth. Nut $\frac{1}{2}$ the length of the glume, round-obovoid, brown.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 530; Urban, Symb. Antill. ii. 12. *K. vaginata*, Lam. Ill. i. 148; Vahl, Enum. ii. 381; Kunth, Enum. ii. 129; Boeck. in Linnæa, xxxv. 416, and in Engl. Gazelle Reise, Bot. 16. *K. globosa*, Beauv. Fl. Owar. i. 50. *K. capitata*, Beauv. Fl. Owar. i. t. 31. *K. aphylla*, Kunth, Enum. ii. 127; Benth. in Hook. Niger Fl. 552; Henriques in Bolet. Soc. Bot. v. 209. *Mariscus aphyllus*, Vahl, Enum. ii. 373. *Lyprolepis denudata*, Steud. Syn. Pl. Glum. ii. 130.

Upper Guinea. Senegal, *Sieber*, 5! *Roger!* Senegambia, *Heudelot*, 150! 449, 452! Gambia, *Skues!* Cape Verd Isles, *Smith!* Sierra Leone, *Don! Vogel!* Liberia: Grand Bassa, *Ansell! Vogel*, 30! Monrovia, *Naumann* (ex *Boeckeler*). Niger Territory: Oware & Benin, *Beauvois!* Niger Delta; Nun River, *Vogel*, 7! *Mann*, 455! Brass, *Barter*, 63! 1849! Cameroons: Batanga, rocky beach south of Lobe Village, *Bates*, 116!

Lower Guinea. Princes Island, *Quintas*, 10! Rolas Island, *Quintas*, 125! Gaboon, *Jardin!* Corisco Bay, *Mann*, 1898!

South Central. Congo Free State, *Dewevre*, 211!

Plentiful in Tropical South America.

The length of the leaves in this species is not a safe character. In Vogel's Grand Bassa examples, correctly named by Bentham "*K. aphylla*," the leaves run to 10 in. long; and several other examples show fairly developed leaves. The species is difficult to separate from *K. pungens*.

18. **K. chlorotropis,** *Steud. in Flora,* 1842, 598. Rhizome 0. Stems subsolitary, 1–2 in. long, slender, thickened and bulb-like at the base. Leaves longer than the stem, $\frac{1}{16}$ in. broad. Head of 3–1 spikes; bracts 2–3, lowest up to 1 in. long, similar to the leaves. Spikes $\frac{1}{4}$ by $\frac{1}{6}$ in., dense, blackish. Spikelets $\frac{1}{12}$ in. long, perfecting 1 nut. Nut-bearing glume ovate, obtuse, with subexcurrent mucro, chestnut-coloured, the keel green, wingless, smooth. Nut $\frac{3}{4}$ the length of the glume, broad ellipsoid, dusky-brown.—Steud. Syn. Pl. Glum. ii. 70; A. Rich. Tent. Fl. Abyss. ii. 493; Boeck. in Linnæa, xxxv. 404; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 527; Engl. Hochgebirgsfl. Trop. Afr. 145 (excl. syn. *K. nervosa*).

Nile Land. Abyssinia: Samen; mountain sides towards Shoata, *Schimper,* 1377! Enjedcap, *Schimper,* 573! Tigre; near Adowa, 6000 ft., *Schimper,* 238, around Memsah, *Quartin-Dillon & Petit,* 16! Setamuko, 8500 ft., *Schimper,* 1303! Sholoda Mountain, 7200 ft., *Schimper,* 859, partly! Without precise locality, *Hildebrandt,* 358!

19. **K. parvula,** *Rendle in Cat. Afr. Pl. Welw.* ii. 103. Rhizome 0. Stems adjacent, thickened and bulb-like at the base, 2–4 in. long, slender. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{20}$ in. broad. Head of 1 spike, apparently lateral, $\frac{1}{8}$–$\frac{1}{6}$ in. in diam., globose, dense; bracts 3–2, the lowest 1–1$\frac{1}{2}$ in. long, erect. Spikelets minute, ovoid, hardly acute, each perfecting 1 nut. Nut-bearing glume full of sunk round red glands; keel not winged. Nut $\frac{3}{4}$ the length of glume, ellipsoid, brown.—*K. cæspitosa,* var. *angustifolia,* Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 145. *K. brevifolia,* C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 527 partly.

Lower Guinea. Angola: Pungo Andongo, 3500 ft., without precise locality, *Welwitsch,* 6781!

20. **K. bracheilema**, *Steud. in Flora,* 1842, 598. Rhizome slender, seen $\frac{1}{3}$ in. long, arising from a very delicate stolon. Stems subsolitary, 2–4 in. long, thickened at the base by torn black sheaths. Leaves about half the length of the stem, $\frac{1}{12}$ in. broad. Head of 1 spike, ovoid-globose, $\frac{1}{4}$ in. in diam., dense, chestnut-coloured; bracts $\frac{2}{3}$ in., lowest up to $\frac{3}{4}$ in. long. Spikelets $\frac{1}{8}$ in. long, each perfecting 1 nut. Nut-bearing glume ovate-lanceolate, mucronate, chestnut-coloured; keel green, wingless, smooth. Nut seen immature.—Steud. Syn. Pl. Glum. ii. 70; A. Rich. Tent. Fl. Abyss. ii. 495; Boeck. in Linnæa, xxxv. 405; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 527; Engl. Hochgebirgsfl. Trop. Afr. 145.

Nile Land. Abyssinia: Samen; Enjedcap, 11,500 ft., *Schimper,* 1371!

This has a much broader spike than *K. chlorotropis,* more acuminate flower-glumes, and often exhibits the very small stolon or rhizome.

21. **K. nervosa,** *Steud. in Flora,* 1842, 597. Rhizome small seen up to $\frac{3}{4}$ in. long. Stems subsolitary, 2–6 in. long, thickened near the base by the torn blackish leaf-sheaths. Leaves often as long as the stem, $\frac{1}{12}$ in. broad. Head of 1 spike, up to $\frac{1}{3}$ by $\frac{1}{4}$ in., ovoid or

very short cylindric, dense, greenish-black; bracts 3, lowest $1\frac{1}{2}$ in. long, similar to the leaves. Spikelets $\frac{1}{8}$ in. long, each perfecting 1 nut. Nut-bearing glume acute, chestnut-coloured, on each side with 4 lurid-yellow nerves; keel wingless, smooth. Nut seen immature.—Steud. Syn. Pl. Glum. ii. 70; A. Rich. Tent. Fl. Abyss. ii. 494; Boeck. in Linnæa, xxxv. 407; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 530; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 49, 104. *K. aurata*, Hochst. in Flora, 1844, 102, not of Nees. *K. chlorotropis*, Engl. Hochgebirgsfl. Trop. Afr. 145 partly.

Nile Land. Eritrea: Keren, *Hildebrandt*, 358! Mount Amba, near Geleb, 6300 ft., *Schweinfurth*, 1361! Abyssinia: near Wadi Schwada, on mountains, *Schimper*, 1375! Sholoda Mountain, 7200 ft., *Schimper*, 589, partly! and without precise locality, *Schimper*, 263! 1320! Somaliland: Abdalla, *Keller*, 81! British East Africa: Ukamba, *Scott-Elliot*, 2346!

22. **K. triceps,** *Rottb. Descr. et Ic.* 14, *t.* 4, *fig.* 6 (*excl. the plate of Rheede and some syns. cited*). Rhizome 0. Stems 2–12 in. long, thickened at the base, cæspitose. Leaves $\frac{1}{10}$ in. broad, $\frac{1}{2}$ as long as (or sometimes as long as) the stem. Head of 3–1 spikes, white or green; bracts 3–4, lowest up to 2–3 in. long, similar to the leaves. Middle spike $\frac{1}{5}$–$\frac{1}{3}$ in. long, very dense, varying from ovoid to oblong-cylindric. Spikelets $\frac{1}{12}$ in. long, each perfecting 1 nut. Nut-bearing glume ovate, very shortly acute, strongly 3–4-striate on each side, sometimes red-spotted and with sunk glands; keel wingless, smooth (except var. β). Nut $\frac{1}{2}$–$\frac{3}{4}$ the length of the glume, ellipsoid, yellow-brown.—Vahl, Enum. ii. 381; Kunth, Enum. ii. 133; A. Rich. Tent. Fl. Abyss. ii. 492?; Boeck. in Linnæa, xxxv. 413 (excl. var. β); Schweinf. Beitr. Fl. Aethiop. 216; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 145 (excl. varieties); C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 587, and in Durand & Schinz, Conspect. Fl. Afr. v. 533; K. Schum. in Engl. Pfl. Ost-Afr. C. 123; Engl. Hochgebirgsfl. Trop. Afr. 145; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 49 partly, 104; Rendle in Cat. Afr. Pl. Welw. ii. 103. *K. bulbosa*, Beauv. Fl. Owar. i. 11, t. 8; Kunth, Enum. ii. 138; Steud. in Flora, 1842, 597, and Syn. Pl. Glum. ii. 71. *K. pumila*, Steud. in Flora, 1842, 596, not of Mich. *K. geminiflora*, Steud. Syn. Pl. Glum. ii. 70. *K. cæspitosa*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 145 in large part. *K. Schimperi*, Hochst. ex Boeck. in Linnæa, xxxv. 414.

Upper Guinea. Senegambia, *Leprieur!* Galam, *Heudelot*, 323! Niger, *Vogel!*

Nile Land. Eritrea: Ginda, at the foot of Donkollo Mountain, 3100 ft., *Schweinfurth*, 138, 350. Galabat: region of Matamma, *Schweinfurth*, 2051 Abyssinia: Begemeder; Gafat, 9000 ft., *Schimper*, 507, 1310! *Quartin-Dillon*, 12! British East Africa: Jur; Kurshook Ali's Seriba, *Schweinfurth*, 1705! Jur Ghattas, *Schweinfurth*, 1913! 1926!

Lower Guinea. Angola: Golungo Alto; without precise locality, *Welwitsch*, 7005B! Pungo Andongo, 3000 ft.; in wet places at Mutollo, *Welwitsch*, 6787! 6787B! between the Præsidium and Quilanga, *Welwitsch*, 6780! marshy places on the higher parts of the Præsidium, *Welwitsch*, 6791! 7160!

Common in India, extending to South China and North Australia.

Var. *ciliata*, Boeck. in Linnæa, xxxv. 414. Nut-bearing glume ciliate (not winged) on the keel.—Boeck. in Flora, 1879, 515 partly; Rendle in Cat. Afr. Pl. Welw. ii. 104; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 533 partly; *K. Welwitschii*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 147.

Lower Guinea. Angola: Loanda; damp places at Zamba Grande, *Welwitsch*, 6793! between Loando and Penedo, *Welwitsch*, 6995! between Penedo and Conceiçao, *Welwitsch*, 6999B! Benguella; near Benguella, *Welwitsch*, 6792! Pungo Andongo; banks of the River Cuanza, near Calemba and Calemba Islands, *Welwitsch*, 6779! Muta Lucale, *Welwitsch*, 6790 partly! between Lombe and Muta Lucale, *Welwitsch*, 6796 partly! and between Bumba and Condo, *Welwitsch*, 6798!

Mozamb. Dist. Portuguese East Africa: Lower Zambesi, Tete, *Kirk!*

Also in India, China, and Australia.

K. triceps, var. *pumila*, Boeck. i.e., Schweinfurth 2053 is *Scirpus kyllingioides*, Boeck. Much of the material referred to *K. triceps*, var. *ciliata* (in Durand & Schinz, Conspect. Fl. Afr. v. 533), I now refer to *K. controversa*, var. *subexalata*; some of the *K. triceps* of Schweinfurth which I have seen is this *K. controversa*, var.; I therefore do not know how much of Schweinfurth's *triceps*, which I have not seen, belongs to *K. controversa*. The difference between *K. triceps*, Rottb. typical, and its var. *ciliata* (as here understood) is trifling.

23. **K. microstyla,** *C. B. Clarke in Kew Bulletin*, 1895, 229. Stems 4–6 in. long, slender, thickened at the base by leaf-sheaths. Leaves about half as long as the stems, $\frac{1}{16}$ in. broad. Head of 3 spikes; bracts 3, lowest $1\frac{1}{2}$ in. long, similar to the leaves. Middle spike $\frac{1}{6}$ by $\frac{1}{8}$ in., dense. Spikelets $\frac{1}{30}$ in. long, each perfecting 1 nut. Nut-bearing glume $\frac{1}{30}$ in. long, ovate; keel wingless, smooth. Nut $\frac{3}{4}$ the length of glume, ellipsoid or obovoid; style hardly any, its 2 small branches hardly half the length of the nut.

Nile Land. Somaliland, *Mrs. Lort-Phillips!* Thuja Steppe, *Keller*, 84!

24. **K. flava,** *C. B. Clarke.* Rhizome oblique, short, stout, covered by torn sheaths. Stems 1–$2\frac{1}{2}$ in. long, not bulbous at the base. Leaves 6 in. long, $\frac{1}{8}$ in. broad. Head of 1 spike, $\frac{1}{2}$ in. (and upwards) long, $\frac{1}{5}$ in. broad, cylindric, dense, yellow; bracts 3, lowest $2\frac{1}{2}$ in. long, similar to the leaves. Spikelets $\frac{1}{10}$ in. long, lanceolate, each perfecting 1 nut. Nut-bearing glume acuminate, 3–4-nerved on each side; keel wingless, smooth, excurrent in a longish mucro.

Nile Land. British East Africa: Taita; Mbuyuni, *Scott-Elliot*, 6233!

25. **K. pumila,** *Mich. Fl. Bor.-Amer.* i. 28. Roots fibrous. Stems cæspitose, 4–18 in. long, rather slender, not thickened at the base, the basal sheaths being rather tight, not torn, usually reddish. Leaves $\frac{1}{4}$–$\frac{3}{4}$ the length of the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Head of 3–1 green or greenish-white spikes dense with small spikelets; bracts 2–4, lowest 2–6 in. long, similar to the leaves. Middle spike $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{6}$–$\frac{1}{5}$ in., short-cylindric, or in the same tuft subovoid and hardly longer than broad. Spikelets $\frac{1}{12}$–$\frac{1}{8}$ in. long, each perfecting 1 (rarely 2) nut. Nut-bearing glume thin, slenderly nerved, without glands; keel stronger, green, wingless, scabrous, excurrent in a small mucro. Nut $\frac{1}{2}$ as long as the

glume, ellipsoid, yellow-brown.—Vahl, Enum. ii. 380; Kunth, Enum. ii. 132 partly; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 531; Durand & Schinz, Études Fl. Congo, i. 279; Durand & De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 88; Urban, Symb. Antill. ii. 13; Rendle in Cat. Afr. Pl. Welw. ii. 103. *K. gracilis*, Afzel. Remed. Guin. 71. *K. monocephala*, Nees in Flora, 1828, 331; Benth. in Hook. Niger Fl. 552 partly. *K. cæspitosa*, Nees in Mart. Fl. Bras. ii. i. 12 (excl. syn. Kunth. et var. β); Boeck. in Linnæa, xxxv. 411; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 145. *K. odorata*, var. *gracilis*, Boeck. in Linnæa, xxxv. 411. *K. polyphylla*, Benth. in Hook. Niger Fl. 552 partly, not of Vahl. *K. rigidula*, Steud. Syn. Pl. Glum. ii. 71 (as to the Nubian plant); Boeck. in Linnæa, xxxv. 416. *K. viridula*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 492. *K. tenuifolia*, Steud. Syn. Pl. Glum. ii. 69. *K. triceps*, Engl. Hochgebirgsfl. Trop. Afr. 145, not of Rottb. *K. brevifolia*, forma, Boeck. in Flora, 1879, 516, not of Rottb. *K. naumaniana*, Boeck. in Flora, 1879, 516; var. *Bennii*, and (?) var. β *tenuis*, Boeck. in Engl. Jahrb. v. 89, and in Engl. Gazelle Reise, Bot. 16. *K. cylindrica*, Henriques in Bolet. Soc. Brot. v. 209, not of Nees.

Upper Guinea. Senegal, *Brunner*, 157! *Leprieur!* Cape Verd Isles, *Brunner*, 137! Sierra Leone, *Don*, 1! *Barter! Scott-Elliot*, 5187 B! Liberia: Monrovia, *Naumann* (ex *Boeckeler*). Ashanti, *Cummins!* Fernando Po, *Vogel*, 11! 219!

Nile Land. Upper Sennar: Fazokl, *Kotschy*, 416! Nubia, *Kotschy*, 516! Abyssinia: mountains near Jelajeranne, *Schimper*, 1641! British East Africa: near Mombasa, *Taylor!*

Lower Guinea. Princes Island, *Newton*, 9! Island of St. Thomas: Novo Moka, Saudade, 2450–2600 ft., *Moller*, 19! and *Fl. Afr. Exsicc. Conimbric*, 126! and without precise locality, *Don*, 2! Gaboon: Sierra del Crystal, *Mann*, 1640! Munda; Sibange Farm, *Soyaux*, 332! Lower Congo; Boma, *Naumann* (ex *Boeckeler*); Lutete, 1500–2000 ft., *Hens*, A, 254! 305! Bingila, *Dupuis!* Angola: Pungo Andongo, 3500 ft.; in the Præsidium, *Welwitsch*, 6796 partly! near the Cabondo Hill, *Welwitsch*, 7153! 7158! and without precise locality, *Welwitsch*, 7167! 6790 partly! Golungo Alto; slopes of eastern Queta, near the banks of the river, *Welwitsch*, 7012 A!

South Central. Congo Free State: Monbuttu; Munza, *Schweinfurth* 3405!

Mozamb. Dist. British Central Africa: Nyasaland; between Kondowe and Karonga, 2500–6500 ft., *Whyte!*

Abundant in America, from Ohio to South Brazil.

This species is exceedingly like *K. brevifolia*, Rottb., except that it wants the creeping rhizome. In reducing so large a number of species, admitted by high authority, I should add that Schimper, 1641 (*K. triceps* ex Boeck.), Soyaux, 332 (*K. naumanniana*, Boeck.), Schweinfurth, 3405 (*K. brevifolia*, ex Boeck.) are not varieties or forms—they are so far as I can see identically one. The greatest variation in the whole set is shown by Kotschy, 416 (*K. rigidula*, Steud.) which is rather stouter than typical *K. pumila*, and has spikes up to $\frac{1}{5}$ in. wide. The American *K. pumila*, with its range of form, easily covers *K. rigidula*.

26. **K. cylindrica,** *Nees in Wight, Contrib.* 91. Rhizome 0 or short, except in var. *appendiculata*. Stem 6–18 in. long, hardly thickened

at the base by leaf-sheaths. Leaves often longer than the stem, $\frac{1}{8}$–$\frac{1}{5}$ in. broad. Head of 3–1 (often 3) white or very pale brown spikes; bracts 3–4, lowest 1–6 in. long, similar to the leaves. Middle spike $\frac{1}{3}$ by $\frac{1}{4}$ in., short-cylindric, green or whitish, dense. Spikelets $\frac{1}{8}$ in. long, each producing 1 nut. Nut-bearing glume ovate, acute, not mucronate, without glands, thin; keel wingless, smooth or very nearly so. Nut $\frac{2}{3}$ the length of the glume, yellow-brown finally black.—Nees in Linnæa, ix. 286; Kunth, Enum. ii. 133; Boeck. in Linnæa, xxxv. 415; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 146; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 588, in Durand & Schinz, Conspect. Fl. Afr. v. 528, and in Dyer, Fl. Cap. vii. 153; K. Schum. in Engl. Pfl. Ost-Afr. C. 123; Engl. Hochgebirgsfl. Trop. Afr. 146; Rendle in Cat. Afr. Pl. Welw. ii. 104. *K. triceps*, Afzel. Remed. Guin. 70, not of Rottb. *K. triceps*, var. β *obtusiflora*, Boeck in Linnæa, xxxv. 414; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 145. *K. triceps*, var. *longispicata*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 146. *K. monocephala*, Benth. in Hook. Niger Fl. 552 partly. *K. macrocephala*, Hook. f. in Journ. Linn. Soc. vi. 22, and vii. 225, not of A. Rich. *K. odorata*, var. β *gracilis*, Boeck. in Linnæa, xxxv. 411 partly. *K. cæspitosa*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 145 partly. *Cyperus Schimperi*, K. Schum. in Engl. Pfl. Ost-Afr. C. 121.

Upper Guinea. Sierra Leone, *Afzelius! Welwitsch*, 6989! Liberia: Bassa Cove, *Ansell!* Niger Territory: Old Calabar, *Robb!* Cameroons: Upper slopes of Cameroon Mountain, 8000–10,000 ft., *Johnston! Mann*, 2104! Fernando Po; Clarence Peak, 7500–8500 ft., *Mann*, 659! 1474!

Nile Land. British East Africa: Ruwenzori, 9000 ft., *Scott-Elliot*, 7757!

Lower Guinea. Angola: Pungo Andongo; 3500 ft., by the River Casalale, *Welwitsch*, 6789! Golungo Alto; Monte de Queta, *Welwitsch*, 7005! Huilla, 5000, ft.; near streams in Morro de Lopollo, *Welwitsch*, 6795! near Humpata, *Welwitsch*, fruit, 1080!

Mozamb. Dist. German East Africa: Kilimanjaro, 5000–6000 ft., *Taylor! Volkens*, 693!

Also in South Africa, Madagascar, India, South China, and Australia. (The American *K. odorata*, Vahl, is hardly specifically separable.)

Var. *major*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 528. Larger than typical *cylindrica*; middle spike more than $\frac{1}{4}$ in. broad; spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. long.—*K. cylindrica*, Nees? ex Oliver in Trans. Linn. Soc. ser. 2, Bot. ii. 353.

Mozamb. Dist. German East Africa: Kilimanjaro, 6000 ft., *Johnston*, 75

Var. *appendiculata*, C. B. Clarke. Rhizome 4 in. long, densely covered with scales.—*K. appendiculata*, K. Schum. in Preuss, Exsicc. 923.

Upper Guinea. Cameroons: Buea, 8250 ft., *Preuss*, 923!

Preuss, 923 is a distinct-looking plant; but the series collected by G. Mann in the Cameroons and Fernando Po fills up the gap between this variety and the type *cylindrica*: Mann, 1474 is var. *appendiculata* almost.

27. **K. ruwenzoriensis,** *C. B. Clarke.* Rhizome seen, 1 in. long, thick. Stems 2–4 in. long, thick, not bulbous at the base; basal leaf-sheaths entire, reddish. Leaves often as long as the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Heads of 3–1 spikes, dusky-white tinged with yellow; bracts 4, lowest up to $2\frac{1}{2}$ in. long, similar to the leaves. Middle spike $\frac{1}{2}$ in. long, more than $\frac{1}{4}$ in. broad, cylindric, dense. Spikelets rather more than $\frac{1}{8}$ in.

long, 3–2-flowered, each often perfecting 2 nuts. Nut-bearing glume ovate, 2–3-nerved on each side, keel wingless, smooth, excurrent into a recurved short bristle. Style hardly any; branches 2, long. Nut more than $\frac{1}{2}$ the length of the glume, ellipsoid, straw-coloured or scarcely brown.

Nile Land. British East Africa: Ruwenzori; Kivata, common up to 8000 ft., *Scott-Elliot*, 7554!

Scott-Elliot has marked this "common," perhaps not distinguishing it from *K. erecta*, to which it is perhaps allied; it differs in being stouter with larger spikes and the glumes with recurved points. The greater number of flowers might be due to luxuriance merely.

28. **K. chrysantha,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 123. The lateral innovations (short stolons) at the base of the stems harden into a rhizome seen $\frac{1}{3}$ in. long. Stems 8 in. long, slender, hardly thickened at the base. Leaves shorter or longer than the stem, hardly attaining $\frac{1}{12}$ in. in breadth. Head of 3–1 spikes, golden-yellow; bracts 3–4, lowest up to 3 in. long, similar to the leaves. Middle spike ovoid, very dense, $\frac{1}{4}$ in. broad, rather longer than broad. Spikelets $\frac{1}{10}$ in. long, rather narrow, each often perfecting 2 nuts. Nut-bearing glume elliptic-lanceolate, strongly striate, hardly acute; keel wingless, smooth. Nut $\frac{3}{5}$ the length of the glume, oblong-ellipsoid.

Mozamb. Dist. German East Africa: Karagwe; Bukoba, *Stuhlmann*, 3227! Ihangiro, *Stuhlmann*, 901! British Central Africa: Nyasaland; among rocks at Namasi, near Zomba, *Cameron*, 92!

The Cape *K. tetragona* is the nearest ally to this.

29. **K. pulchella,** *Kunth, Enum.* ii. 137. Stolons very slender; rhizome seen $\frac{1}{2}$ in. long, very slender. Stems 6–18 in. long, hardly bulbous at the base. Leaves often as long as the stem, $\frac{1}{10}$–$\frac{1}{8}$ in. broad. Head of 3–1 spikes, deep chestnut-coloured; bracts 3, lowest up to 3 in. long, similar to the leaves. Middle spike attaining $\frac{2}{3}$ by $\frac{1}{3}$ in., usually smaller, sometimes scarcely $\frac{1}{4}$ in. long, ovoid. Spikelets numerous, $\frac{1}{6}$–$\frac{1}{5}$ in. long, each perfecting 3–1 nuts. Nut-bearing glume ovate, acuminate, mucronate, obscurely nerved on the sides, black- or rusty-chestnut; keel green or greenish-yellow, wingless, smooth. Nut $\frac{1}{2}$ the length of the glume, ellipsoid, brown.—Hochst. in Flora, 1844, 102; A. Rich. Tent. Fl. Abyss. ii. 494; Boeck. in Linnæa, xxxv. 405; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 531, and in Dyer, Fl. Cap. 154; Engl. Hochgebirgsfl. Trop. Afr. 145. *K. atrosanguinea*, Steud. in Flora, 1842, 598, and Syn. Pl. Glum. ii. 69.

Nile Land. Abyssinia: near Dubomara, *Schimper*, 1269! Shireh; banks of the River Tacazze, *Quartin-Dillon & Petit!* Begemeder; Gottes Claudius, *Schimper*, 1302! 1313! near Gafat, *Schimper*, 1315! and without precise locality, *Schimper*, 257! 1307! 1550!

Also frequent in South Africa.

30. **K. oblonga,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 530. Rhizome horizontal, short, thick, covered by black scales.

Stems 1 ft. long, rather slender, not thickened at the base, contiguous in one row. Leaves often as long as the stem, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, weak. Head of 3–1 spikes, green-white; bracts 5–4, lowest up to 4 in. long, similar to the leaves. Middle spike more than $\frac{1}{2}$ in. long, $\frac{1}{5}$ in. broad, oblong, dense. Spikelets $\frac{1}{8}$ in. long, with 2 perfect flowers. Nut-bearing glume elliptic, acuminate, mucronate, 2–3-nerved on each side; keel wingless, hispid-ciliate. Nut $\frac{1}{2}$ the length of the glume, oblong, black.—K. Schum. in Engl. Pfl. Ost-Afr. C. 123.

Nile Land. British East Africa: Rubai Hills, near Mombasa, *Taylor!* Nyika country, near Mombasa, *Taylor!* East Ongalea Mountains, 2000 ft., *Gregory*, 13!

This is allied to *K. cylindrica*, but differs in the hispid-ciliate keel to the glumes.

31. **K. bulbocaulis,** *Boeck. in Flora*, 1875, 258. Rhizome hardly any. Stems 6–8 in. long, tufted at the base and much thickened by the long torn tough brown leaf-sheaths. Leaves longer than the stem, $\frac{1}{8}$ in. broad. Head of 1 globose straw-coloured spike $\frac{1}{4}$–$\frac{1}{3}$ in. in diam.; bracts 3, lowest 4 in. long, similar to the leaves. Spikelets $\frac{1}{6}$ in. long, 3-flowered; each often perfecting 2 nuts. Nut-bearing glume scarcely acute, 5–8-ribbed on each side; keels wingless, smooth.—Oliver in Trans. Linn. Soc. xxix. 167; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 527; K. Schum. in Engl. Pfl. Ost-Afr. C. 123. *Kyllinga* sp. n. 1, T. Thoms. in Speke, Nile, Append. 654.

Mozamb. Dist. Zanzibar, *Speke & Grant*, 13! German East Africa: Karagwe; top of a hill, *Speke & Grant*, 410!

32. **K. Buchanani,** *C. B. Clarke in Dyer, Fl. Cap.* vii. 155. Rhizome hardly any. Stems 6–15 in. long, tufted, not thickened at the base; basal sheaths reddish, not torn. Leaves often $\frac{2}{3}$ as long as the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Head of 1 globose or globose-cylindric spike, $\frac{1}{3}$ in. long, straw-coloured, dense; bracts 3, lowest 4 in. long, similar to the leaves. Spikelets $\frac{1}{5}$ in. long, each often perfecting 2 nuts. Nut-bearing glume 1-coloured, hardly acute, obscurely ribbed, with a few round sunk glandular dots; keel wingless, smooth, not at all green. Nut $\frac{1}{2}$ as long as the glume, yellow-brown.

Mozamb. Dist. British Central Africa: Nyasaland; Blantyre, *Buchanan*, 159! Zomba and vicinity, 2800–3500 ft., *Whyte!*

Also in South Africa.

In *K. alba*, Nees, and *K. controversa*, Steud., when the wing of the keel is very narrow, it is strongly ciliate.

33. **K. nigripes,** *C. B. Clarke.* Roots fibrous, wiry. Stems 12–14 in. long, thickened at the base by the torn black basal sheaths 1–1$\frac{1}{4}$ in. long and very harsh rigid. Leaves as long as the stem, $\frac{1}{6}$ in. broad. Head of 1 spike, $\frac{1}{3}$ in. in diam., ovoid, dense, straw-coloured; bracts 3, lowest 2$\frac{1}{2}$ in. long, similar to the leaves. Spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. long, each usually perfecting 2 nuts. Nut-bearing glume elliptic-lanceolate, sub-acute, strongly 4-ribbed on each side; keel wingless and smooth above,

with short very contiguous cilia coalescing almost into a wing in the lower half. Nut $\frac{1}{2}$ as long as glume, ellipsoid, quite black.

Mozamb. Dist. British Central Africa: Nyasaland, *Buchanan*, 1428!

34. **K. exigua,** *Boeck. in Abhandl. Naturw. Ver. Bremen*, vii. 36. Stems 2–10 in. long, with basal bulbs $\frac{1}{5}$ in. in diam., woody, and also sometimes throwing out very slender stolons 2 in. long and hardly $\frac{1}{30}$ in. in diam. Leaves often as long as the stem, $\frac{1}{12}$ in. broad. Head of 3–1 straw-coloured spikes; bracts 3, lowest 2 in. long, similar to the leaves. Spikes $\frac{1}{4}$ in. in diam., ovoid, dense. Spikelets $\frac{1}{10}$ in. long, 2–3-flowered. Nut-bearing glume ovate, acute, obscurely ribbed; keel wingless, smooth green. Nut not seen.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 529.

Nile Land. Somaliland, *Donaldson Smith!*

Also in the Mascarene Islands.

Boeckeler's description of this species was drawn up from depauperated examples.

35. **K. albiceps,** *Rendle in Cat. Afr. Pl. Welw.* ii. 106. Stem 4–9 in. long, rather slender, solitary, bulbous at the base; sometimes with very slender stolons hardening into rhizomes $2\frac{1}{2}$ in. long, less than $\frac{1}{20}$ in. broad. Leaves usually much shorter than the stem, $\frac{1}{8}$–$\frac{1}{5}$ in. broad. Head of 3–1 (mostly 3) spikes, dusky straw-coloured; bracts 3, lowest 2 in. long, similar to the leaves. Middle spike ovoid, $\frac{1}{4}$–$\frac{1}{3}$ in. long, dense. Spikelets $\frac{1}{6}$ in. long, each perfecting 2–5 nuts. Nut-bearing glume ovate, scarcely acute, obscurely ribbed, usually with sunk round red or blackish glands; keel wingless, smooth. Ripe nut not seen.—*K. macrocephala*, var. *angustior*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 529; Durand & Schinz, Études Fl. Congo, i. 279. *Cyperus albiceps*, Ridley in Journ. Bot. 1884, 16.

Upper Guinea. Niger Territory: Old Calabar, *Robb! Holland*, 50! Cameroons: Rio del Rey, *Johnston!*

Nile Land. British East Africa: Ruwenzori, 5000 ft., *Scott-Elliot*, 7626!

Lower Guinea. Lower Congo, *Smith!* Stanley Pool, 900 ft., *Hens*, B, 14 Kisantu, on the Inkissi River, *Gillet*, 442! Angola: Pungo Andongo; in the Præsidium, *Welwitsch*, 6796 partly!

South Central. Congo Free State: Mzona, *Descamps!* Albertville, near Tanganyika, *Huy!*

Mozamb. Dist. Lake Tanganyika, *Storms!* British Central Africa: Nyasaland; in shallow pools by the River Nsessi, *Scott!*

This differs very little from *K. macrocephala*, A. Rich., but by the slenderer stems. The glands in the glumes are usually very prominent in *K. albiceps*, but sometimes they are very few. Scott-Elliot, 7626, has much smaller heads and spikelets than the type form.

36. **K. macrocephala,** *A. Rich. Tent. Fl. Abyss.* ii. 491. Stem 8–12 in. long, stout, at the base decumbent for 0–$1\frac{1}{2}$ in.; basal sheaths not torn. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{6}$–$\frac{1}{5}$ in. broad. Head of 3–1 spikes, large, straw-coloured; bracts 3–5, lowest 3 in. long, similar

to the leaves. Middle spike ovoid, $\frac{1}{3}$ in. long and upwards, dense. Spikelets $\frac{1}{5}$ in. long, each perfecting 3–5 nuts. Nut-bearing glume ovate-lanceolate, hardly acute, obscurely ribbed, without glands; keel straw-coloured, wingless, smooth or scarcely scabrous. Nut nearly $\frac{1}{2}$ the length of the glume, ellipsoid, yellow-brown.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 529 partly; K. Schum. in Engl. Pfl. Ost-Afr. C. 123; Durand & Schinz, Études Fl. Congo, i. 279; Engl. Hochgebirgsfl. Trop. Afr. 145. *K. leucantha*, Boeck. in Linnæa, xxxviii. 356. *Cyperus Richardi*, Steud. Syn. Pl. Glum. ii. 8. *Cyperi* (potius quam *Kyllingi*) sp., Benth. in Journ. Linn. Soc. xv. 507.

Nile Land. Abyssinia: Tigre; by the River Tacazze, near Tchelalchekemneh, *Quartin-Dillon*; Begemeder; near Senka Berr, in the valley of the Reb, 6000 ft., *Schimper*, 1305! and without precise locality, *Schimper*, 540!

Mozamb. Dist. East Africa, *Fischer*, 625! Portuguese East Africa: Quilimane, *Stuhlmann*, 96!

The rhachilla disarticulates above the two lowest empty glumes of the spikelet, falling off in one piece on which the nut-bearing glumes persist—*Kyllinga* and *Pycreus* are two closely allied genera; they cannot be distinguished by the number of flowers (or nuts) to the spikelet. According to the character relied on here to separate them, *K. macrocephala* is an unmistakable *Kyllinga*.

37. **K. leucocephala,** *Boeck. in Flora*, 1875, 257. Stems 1 ft. high, densely tufted, thickly surrounded at the base by the torn lacerate dark-brown tough leaf-sheaths. Leaves 4–5 in. long, $\frac{1}{8}$ in. broad. Head of 1 globose dense spike, $\frac{1}{3}$ in. in diam., straw-coloured; bracts 3, lowest $2\frac{1}{2}$ in. long, similar to the leaves. Spikelets $\frac{1}{5}$ in. long, each perfecting 3–2 nuts. Nut-bearing glumes elliptic-lanceolate.—Oliver in Trans. Linn. Soc. xxix. 166. *K. aurea*, T. Thoms. in Speke, Nile, Append. 654, not of Nees. *K. macrocephala*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 529.

Mozamb. Dist. German East Africa: Uyanzi; common in moist woods at the "BossRock" in the Mgunda Mkhali, *Speke & Grant!*

The main difference between this and *K. macrocephala* is that the stems in *K. leucocephala* arise from a dense bed of the fibres of the torn leaf-sheaths. *K. leucocephala*, K. Schum. in Engl. Pfl. Ost-Afr. C. 123 (i.e., Holst, 2018, collected at Tanga), has a single row of stems having their bulbous bases contiguous on a horizontal rhizome. It is very young (possibly = *K. crassipes*?) but I believe cannot be *K. leucocephala*, Boeck.

38. **K. eximia,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 529. Stem 1 ft. long, at the base somewhat thickened by sheaths hardly torn. Leaves as long as the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Head of 1 globose spike exceeding $\frac{1}{2}$ in. in diam., dense, pale cinnamon-coloured; bracts 3, lowest 4 in. long, similar to the leaves. Spikelets $\frac{1}{5}$–$\frac{1}{3}$ in. long, each perfecting 3–5 nuts, much compressed. Nut-bearing glume ovate, acuminate, acute, 3–4-ribbed on each side; keel wingless, somewhat scabrid. Young nut very large.

Nile Land. Somaliland: Harradigit, *James & Thrupp!*

Spikelets and glumes much larger than in any other species.

Var. *Kelleri*, C. B. Clarke. Spike and spikelets rather smaller. Nut-bearing glumes elliptic, subtriangular at the tip, not at all acuminate.

Nile Land. Somaliland: Abdallah, *Keller*, 80! 87!

2. **PYCREUS**, Beauv. Fl. Owar. ii. 48, t. 86, fig. 2.

Spikes umbellate or solitary, or of only 1 spikelet. Spikelets 5–40-flowered; glumes distichous, 2 lowest empty, several succeeding bisexual and perfecting nuts, caducous in fruit from the lowest upwards; rhachilla persistent, not winged. Stamens 3–1, anterior; anthers narrow-oblong, not crested. Style passing continuously into the top of the pistil, not bulbous at the base; branches 2, linear in a plane passing through the rhachilla. Nut ellipsoid or obovoid, compressed laterally.—Glabrous. Leaves all close to the base of the nodeless stem (in species 9–11 the stem is more clothed by leaf-sheaths in its lower half), green and long. Spikelets in ebracteolate (rarely bracteolate in *P. albomarginatus*) clusters or spikes arranged in bracteate umbels; bracts similar to the leaves, only smaller.—*Cyperus*, Benth. et Hook. f. Gen. Pl. iii. 1043 partly.

Species 63; in all tropical and warm-temperate regions, a few extending to Canada and Amurland.

*Zonatæ.—Superficial cells of the nut longitudinally oblong or elliptic. Nut often appearing zonate or muricate by reason that the thickened ends of the cells run into an undulating or broken horizontal line.

Annuals.
- Spikelets yellow or reddish, hardly at all chestnut-coloured.
  - Spikelets yellowish, with parallel sides . . 1. *P. flavescens.*
  - Spikelets reddish-brown, lanceolate . . 2. *P. intermedius.*
  - Spikelets yellow, brown-spotted, elliptic 5. *P. pauper.*
- Spikelets chestnut-brown.
  - Leaves and stems slender . . . . 3. *P. rehmannianus.*
  - Leaves and stems capillary . . . . 4. *P. debilissimus.*

Perennials. Rhizomes or stolons frequent.
- Spikelets $\frac{1}{8}$ in. wide . . . . . 7. *P. subtrigonus.*
- Spikelets $\frac{1}{6}$ in. wide at least.
  - Stems and leaves slender . . . . 6. *P. nigricans.*
  - Stems stouter; leaves thicker . . . 8. *P. macranthus.*

**Puncticulatæ.—Superficial cells of the nut nearly square. Nut often appearing dotted very regularly, by reason of the light reflected from the convex surface of each cell.

- Stems clothed for $\frac{1}{4}$–$\frac{3}{4}$ their length by leaf-sheaths, decumbent at the base.
  - Spikelets turgid, greenish-brown, tinged dark-red . . . . . 9. *P. sanguinolentus.*
  - Spikelets flattened, hardly turgid; glumes not inflated.
    - Glumes green with black nerves . . . 10. *P. atronervatus.*
    - Glumes rich or pale brown . . . . 11. *P. Mundtii.*
- Stems enveloped by the leaf-sheaths only a little way above the base.

Spikes umbellate, sometimes nearly in a head, straw-coloured, yellowish or reddish, not chestnut-brown nor black. Roots fibrous (or rhizome less than $\frac{1}{4}$ in. long).
Spikelets small, delicate; glumes whitish, very thin.—Annuals.
Spikelets $\frac{1}{12}$ in. broad . . . . 12. *P. nitens.*
Spikelets $\frac{1}{8}$ in. broad . . . . 13. *P. pumilus.*
Spikelets yellowish, ferruginous, or brown-red; glumes not scarious.
Nut symmetric.
Spikelets $\frac{1}{12}$ in. wide, not bright . . 14. *P. polystachyos.*
Spikelets $\frac{1}{6}$ in. wide, bright ferruginous . 18. *P. ferrugineus.*
Spikelets $\frac{1}{20}$–$\frac{1}{16}$ in. wide, bright brown-red . . . . . 19. *P. Hildebrandtii.*
Nut one-sided, the part next the rhachilla flattened. Spikelets yellowish.
Spikelets $\frac{1}{6}$ in. wide . . . . 16. *P. sulcinux.*
Spikelets $\frac{1}{10}$ in. wide . . . . 17. *P. pelophilus.*
Spikes in 1 head (or in a very close umbel), white, straw-coloured or yellowish.
Head 1, more or less yellow.
Stem and leaves rather slender; spikelets $\frac{1}{8}$ in. wide . . . . . 21. *P. propinquus.*
Stem and leaves capillary; spikelets $\frac{1}{12}$ in. wide . . . . . 22. *P. capillifolius.*
Umbel very close; heads white.
Stems bulbous at the base . . . 23. *P. smithianus.*
Stems not thickened at the base, decumbent . . . . . 24. *P. cuanzensis.*
Spikes in a simple umbel (or in 1 head), chestnut, black or dusky brown.
Stolons 0. No woody rhizome.
Plants very slender; stems less than 6 in. high.
Spikelets $\frac{1}{25}$ in. broad . . . . 25. *P. minimus.*
Spikelets $\frac{1}{16}$ in. broad . . . . 26. *P. melas.*
Plants medium-sized. Stems 6–28 in. high.
Glumes not overlapping in fruit, black-chestnut with green keel . . 27. *P. elegantulus*
Glumes closely overlapping in fruit.
Spikelets lanceolate, i.e., sides not parallel . . . . . 15. *P. Æthiops.*
Spikelets linear-oblong, sides parallel . 20. *P. globosus.*
Rhizome woody or stolons present.
Head 1 only . . . . . 29. *P. nyasensis.*
An umbel, or distinctly compound head.
Spikes chestnut to black or a rich brown.
Spikelets moderately compressed . 28. *P. umbrosus.*
Spikelets strongly flattened . . 31. *P. betschuanus.*
Spikes a smoky yellow-red . . . 30. *P. spissiflorus.*
Umbels compound, or subsimple, large. Spikelets yellow, straw-coloured or pale brown.
Umbel subsimple. Margins of glumes crisped wavy . . . . . 32. *P. angulatus.*

Umbel compound. Margins of glumes conspicuously scarious.	
Spikelets $\frac{1}{6}$ in. wide, glistening . . .	33. *P. albomarginatus.*
Spikelets $\frac{1}{10}$ in. wide, hardly glistening .	34. *P. tremulus.*

1. **P. flavescens,** *Reichb. Fl. Germ. Excurs.* 72. Annual. Stems 1–12 in. long. Leaves $\frac{2}{3}$ as long as the stem, $\frac{1}{16}$–$\frac{1}{8}$ in. broad. Spikes loosely umbellate (or 1); bracts 2–4, overtopping the umbel. Spikes of 3–12 clustered spikelets, ebracteolate. Spikelets $\frac{1}{2}$ by $\frac{1}{12}$ in. (in the form *abyssinica*, $\frac{3}{4}$ by $\frac{1}{8}$ in.), compressed, parallel-sided, straw-coloured more or less red-tinged, each perfecting 8–36 nuts. Glumes close-placed, ovate, obtuse, boat-shaped, inflated. Nut hardly $\frac{1}{2}$ the length of the glume, transversely white-muriculate by reason of the sub-persistent ends of the small longitudinally-oblong superficial cells.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 589, in Durand & Schinz, Conspect. Fl. Afr. v. 537, and in Dyer, Fl. Cap. vii. 156; Durand & Schinz, Études Fl. Congo, i. 281; Urban, Symb. Antill. ii. 16. *Cyperus flavescens*, Linn. Sp. Pl. ed. 2, 68, not Linn. Herb.; Kunth, Enum. ii. 5; A. Rich. Tent. Fl. Abyss. ii. 474; Boeck. in Linnæa, xxxv. 438; C. B. Clarke in Journ. Linn. Soc. xx. 279; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 125; Zarb in Cat. Spéc. Bot. Pfund, 39; K. Schum. in Engl. Pfl. Ost-Afr. C. 117. *P. flavescens*, var. *abyssinica*, C. B. Clarke in Journ. Linn. Soc. xx. 279; Rendle in Cat. Afr. Pl. Welw. ii. 106. *C. abyssinicus*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 474; Steud. Syn. Pl. Glum. ii. 4; Boeck. in Linnæa, xxxv. 440, and in Flora, 1879, 545 incl. var. *monocephala*; Schweinf. Beitr. Fl. Aethiop. 214; Engl. Hochgebirgsfl. Trop. Afr. 137; not of Oliver.

Upper Guinea. Senegal, *Perrottet!* Sierra Leone; near Freetown, *Welwitsch*, 7055! Niger Territory: Nupe, in rice fields, *Barter*, 1567!

Nile Land. Kordofan: Er Rahad, *Pfund*, 604. Galabat: region of Matamma, *Schweinfurth*, 2011! Abyssinia: Tigre; near Adowa, *Schimper*, 122! Mai Kabi, *Schimper*, 297! Dehli-Dikeno, *Schimper*, 253! Shireh; in inundated places, *Quartin-Dillon!* British East Africa: by the River Tigirish, *Gregory!* by the Bahr el Ghazal, near the Nuer Villages, *Schweinfurth*, 1173! 1251! Bongo; Addai, *Schweinfurth*, 1433!

Lower Guinea. Lower Congo: at the mouth of the River Kwa, 1000 ft., *Hens*, C, 117! Angola: Pungo Andongo, 3500 ft., in and near the Præsidium, *Welwitsch*, 6907! 6911! banks of the River Cuanza, near Sansamanda, *Welwitsch*, 6922! marshes near Quitage, *Welwitsch*, 6923! Ambaca; marshes near Lake Canguele Canganga, *Welwitsch* 7087! 7096! Golungo Alto; boggy places near Sange, *Welwitsch*, 7072! 7101! near Ponte de Luiz Somoes, *Welwitsch*, 7088!

Mozamb. Dist. Zanzibar, *Taylor!* British Central Africa: Tanganyika Plateau, at Fort Hill, 3500–4000 ft., *Whyte!* margins of ponds by the Nsessi River, *Scott!*

Also in Europe, West Asia, North Africa, and America from Canada to South Brazil.

2. **P. intermedius,** *C. B. Clarke.* Annual. Stems 4–8 in. long. Leaves $\frac{2}{3}$ as long as the stem, $\frac{1}{16}$–$\frac{1}{10}$ in. broad. Spikes loosely umbellate (or 1); bracts 2–3, suberect, lowest up to 4 in. long, similar to the leaves. Spikes of 3–8 clustered spikelets, ebracteolate. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{10}$–$\frac{1}{8}$ in., compressed, narrower at each end, reddish-brown, each perfecting

5–10 nuts. Glumes ovate, obtuse, boat-shaped, inflated. Nut ½ the length of glume, ellipsoid, brown, transversely muriculate by reason of the subpersistent ends of the small longitudinally-oblong persistent cells.—*P. lanceolatus*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 538; Rendle in Cat. Afr. Pl. Welw. ii. 107, but not *Cyperus lanceolatus*, Poir. *C. intermedius*, Steud. in Flora, 1842, 581, and Syn. Pl. Glum. ii. 5; A. Rich. Tent. Fl. Abyss. ii. 483 (but erroneously placed in *Eu-Cyperus*); Boeck. in Linnæa, xxxv. 450, excl. vars. β, γ. *C. Eragrostis*, Krauss in Flora, 1845, 754 in note, not of Vahl. *C. lanceolatus*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 125; Engl. Hochgebirgsfl. Trop. Afr. 138, not of Poiret.

Nile Land. Abyssinia: Tigre; near Jomara, *Schimper*, 1267! Begemeder, *Schimper*, 1243.

Lower Guinea. Angola: Huilla; near Lopollo, *Welwitsch*, 6873!

3. **P. rehmannianus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 542, *excluding several numbers cited.* Roots fibrous. Stems tufted, up to 15 in. long, rather slender. Leaves 10 by ⅛–1/6 in. Umbel up to 4 in. in diam., simple, of 10–25 spikelets; bracts 3, lowest 4–8 in. long, similar to the leaves. Spikes of 3–10 loosely arranged spikelets, ebracteolate. Spikelets ½–¾ by ⅙ in., much compressed, with parallel sides, 20–30-nutted, chestnut-brown. Glumes ovate, boat-shaped, obtuse, 1-nerved. Nut ⅓ the length of the glume, obovoid, compressed, white muriculate; outermost cells oblong, conspicuous.—C. B. Clarke in Dyer, Fl. Cap. vii. 156. *Cyperus rehmannianus*, Boeck. ex C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 542.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Zomba, 4000–6000 ft., *Whyte!*

Also in South Africa.

The species was founded on Rehmann's Transvaal plant; Whyte's specimens are much finer and more developed, but the brilliant small nut, much narrowed at the base, is the same!

4. **P. debilissimus,** *C. B. Clarke in Journ. Bot.* 1896, 224. Annual, very slender, weak. Stems 3–6 in. long, capillary. Leaves few, nearly as long as the stem, setaceous, flaccid. Head 1, of 8 subsessile spikelets; bracts 2, lower 2 in. long, similar to the leaves. Spikelets ⅖ by 1/12 in., 20-flowered, chestnut-brown, compressed, somewhat turgid. Glumes ovate, obtuse, chestnut-coloured; keel chestnut-brown. Nut nearly ½ the length of the glume, obovoid, nearly black; outermost cells distinctly longitudinal.

Nile Land. British East Africa: Tana River, *Gregory*, 87!

5. **P. pauper,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 540. Annual, weak. Stems 4–7 in. long. Leaves as long as the stem, setaceous. Head 1, of 2–1 sessile spikelets; bracts 2, the lower 2 in. long, erect, similar to the leaves. Spikelets ¼–⅓ by ⅙ in., 4–10-flowered, compressed, turgid, yellow, with the upper margins of the glumes dark-brown. Glumes ovate, not acute, with 3 greenish nerves on the back. Nut ⅓–½ the length of the glume, obovoid, black,

transversely muriculate.—Rendle in Cat. Afr. Pl. Welw. ii. 107. *Cyperus pauper*, A. Rich. Tent. Fl. Abyss. ii. 478 (but erroneously placed in *Eu-Cyperus*); Boeck. in Linnæa, xxxv. 451; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 126; K. Schum. in Engl. Hochgebirgsfl. Trop. Afr. 138. *C. intermedius*, var. *tenuis*, Boeck. in Linnæa, xxxv. 451.

Nile Land. Abyssinia: Sana; in marshes on the mountain plain of Walcha, *Schimper*, 1602! Shireh province, *Petit!* Begemeder, *Schimper*, 1311!

Lower Guinea. Angola: Ambaca; borders of flooded fields between the River Caringa and Lake Canguele Canganga, *Welwitsch*, 7069!

A species of *Fimbristylis* is mixed with Schimper, 1602, and it is partly from the mixture of plants that this species has been so strangely described; Steudel (Syn. Pl. Glum. ii. 5) says that the stems when young are patently hairy, when old, glabrous.

6. **P. nigricans,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 539. Rhizome seen oblique, woody, short; stolons sometimes present (fide *Boeckeler*). Stems 8–24 in. long, slender; basal sheaths long, brown, stout, apparently thickening the stems. Leaves often $\frac{1}{2}$ the length of the stem, $\frac{1}{10}$–$\frac{1}{8}$ in. broad. Head 1, of 3–11 black (rarely dark-brown) sessile spikelets; bracts 2–3, lowest 3–4 in. long, similar to the leaves. Spikelets attaining $\frac{1}{2}$ by $\frac{1}{5}$ in. (sometimes only $\frac{2}{3}$ these dimensions), compressed, narrowed at each end, 10–20-flowered. Glumes close-packed, ovate, obtuse, inflated; keel green. Nut $\frac{2}{5}$ the length of the glume, oblong or somewhat obovoid, black; outermost cells (on the shoulders of the nut) elliptic.—C. B. Clarke in Trans. Linn. Soc. ser. 2, Bot. iv. 53. *Cyperus nigricans*, Steud. in Flora, 1842, 584, and Syn. Pl. Glum. ii. 12; A. Rich. Tent. Fl. Abyss. ii. 476; Boeck. in Linnæa, xxxv. 462; C. B. Clarke in Journ. Linn. Soc. xxi. 42; K. Schum. in Engl. Pfl. Ost-Afr. C. 117; Engl. Hochgebirgsfl. Trop. Afr. 139.

Nile Land. Abyssinia: Samen; swamps near Enjedcap, *Schimper*, 1373! Begemeder; Gafat, *Schimper*, 1286! British East Africa: Nandi, by streams, 7000–8000 ft., *Scott-Elliott*, 6963!

Mozamb. Dist. German East Africa: Kilimanjaro, 10500 ft., *Volkens*, 2014! British Central Africa; Nyasaland; Mount Malosa, 4000–6000 ft., *Whyte!* Mount Zomba, 4000–6000 ft., *Whyte!* Mount Mlanji, 6000 ft., *Whyte!* Shire Highlands, *Buchanan*, 28! and without precise locality, *Buchanan*, 990! 1454!

The nut is reticulated rather than muricated; the species is near *P. umbrosus*, Nees.

7. **P. subtrigonus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 542. Rhizome descending, seen $1\frac{1}{2}$ in. long, $\frac{1}{16}$ in. thick. Stems 6–14 in. long. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{8}$ in. broad. Spike solitary, of 12–30 spikelets; bracts 3, lowest 3 in. long, similar to the leaves. Spikelets $\frac{1}{2}$–$\frac{2}{3}$ by $\frac{1}{8}$ in., compressed, yellow-brown, 20–36-flowered, with parallel sides. Glumes ovate, obtuse, keeled. Nut $\frac{1}{3}$ the length of the glume, obovoid, with a protuberance on each side so that it is almost trigonous; style-branches 2, linear, in a plane passing through the axis of the spikelet; outermost cells loosely elliptic,

longitudinal.—Durand & Schinz, Études Fl. Congo, i. 282; De Wild. & Durand, Ill. Fl. Congo, i. 37, t. 19.

Lower Guinea. Lower Congo: Lutete, by the 'River Ntombi, *Hens*, A, 251!

South Central. Congo Free State: Equator, 1000 ft., *Hens*, C, 182!

This species is altogether a *Pycreus;* but it is the only one which affords any clue to the route by which *Cyperus* has passed into *Pycreus*. The nut has sometimes a large asymmetric depression, being then similar to the nut of *Carex*, called "nux prava" by Boott.

8. **P. macranthus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 538. Roots fibrous. Stems 1–2 ft. long, somewhat thick, triquetrous at the top. Leaves 12 by $\frac{1}{8}$–$\frac{1}{6}$ in. broad; sheaths of rather lax tissue, transversely lineolate. Umbel 3–1 in. in diam., often contracted, nearly into 1 head of 6–30 spikelets; bracts 3, lowest 3–8 in. long, similar to the leaves. Spikes of 3–8 spikelets, dark-chestnut-coloured. Spikelets up to 1 by $\frac{1}{4}$ in. (sometimes only $\frac{2}{3}$ these dimensions), each 16–28-nutted. Glumes ovate, obtuse, inflated. Nut very small, scarcely $\frac{1}{4}$ the length of the glume, obovoid, black; outermost cells very obscure.—C. B. Clarke in Dyer, Fl. Cap. vii. 156; Rendle in Cat. Afr. Pl. Welw. ii. 107. *Cyperus macranthus*, Boeck. in Linnæa, xxx. 462; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 126; K. Schum. in Engl. Pfl. Ost-Afr. C. 117. *C. lanceus*, var. *macrostachya*, Kunth, Enum. ii. 8.

Lower Guinea. Angola: Huilla; marshy places at Empalanca, 5000 ft., *Welwitsch*, 6877!

Mozamb. Dist. German East Africa: between Lake Tanganyika and Lake Rukwa, 6000 ft., *Nutt!*

Also in South Africa.

Kunth regarded *P. macranthus* as the full form of *P. nigricans*. Boeckeler separated off his single Cape type of *P. macranthus* (from all the mountain Abyssinian *P. nigricans*) by its thicker stem, and much longer, brighter spikelets. The accession of material from intermediate localities has made it difficult to keep the two species separate; Buchanan, 28 (from the Shiré Highlands) at first placed in *P. macranthus*, was subsequently removed to *P. nigricans*. At all events, Nutt's plant from Lake Tanganyika is typically *P. macranthus*.

Var. *angustifolius*, C. B. Clarke ex Rendle in Cat. Afr. Pl. Welw. ii. 107. Stolons long, scarcely $\frac{1}{36}$ in. in diam., covered by narrow-lanceolate scales $\frac{1}{3}$ in. long. Leaves very narrow. Spikelets $\frac{1}{2}$ by $\frac{1}{8}$ in. Nut having the outermost cells longitudinally oblong.—*C. lanceus*, var. *angustifolius*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 126.

Lower Guinea. Angola: Pungo Andongo; Candumba, 3300 ft., *Welwitsch*, 6930! Quita; Gambos, *Newton*, 20!

The nut, though not ripe, shows that these plants must go with *P. macranthus* and *P. nigricans* rather than with *P. umbrosus* (*Cyperus lanceus*).

9. **P. sanguinolentus,** *Nees in Linnæa*, ix. 283. Stem 4–18 in. long, covered $\frac{1}{4}$ its length by leaf-sheaths, often flowering the first year, or usually decumbent at the base, rooting and often long creeping. Leaves as long as the stem or scarcely half so long, $\frac{1}{10}$–$\frac{1}{6}$ in. broad. Umbel simple, usually narrow, often contracted nearly into 1 head;

bracts 3, lowest 3–6 in. long, similar to the leaves. Spikelets $\frac{1}{2}$–$\frac{2}{3}$ by $\frac{1}{10}$–$\frac{1}{8}$ in., 6–30-flowered, not much compressed, greenish-brown more or less tinged with dark red. Glumes ovate, obtuse, turgid, 3–5-nerved on the back. Nut $\frac{1}{3}$–$\frac{1}{2}$ the length of the glume, obovoid, biconvex, ashy-brown; style longer than the nut, its linear branches long exserted; superficial cells of the nut small, subquadrate hexagonous.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 590, and in Durand & Schinz, Conspect. Fl. Afr. v. 542. *Cyperus sanguinolentus*, Vahl, Enum. ii. 351. *C. Eragrostis*, Kunth, Enum. ii. 7; Boeck. in Linnæa, xxxv. 443, incl. vars.; Schweinf. Beitr. Fl. Aethiop. 215; Engl. Hochgebirgsfl. Trop. Afr. 138; K. Schum. in Engl. Pfl. Ost-Afr. C. 117; Vahl, Enum. ii. 322 ? partly ? *C. nevrotropis*, Steud. in Flora, 1842, 583, and Syn. Pl. Glum. ii. 12; A. Rich. Tent. Fl. Abyss. ii. 476. *C. flavescens*, A. Rich. Tent. Fl. Abyss. ii. 474 partly.

Nile Land. Eritrea: Hamasen district, *Steudner*, 933! Abyssinia: Tigre; near Adowa, *Schimper*, 122 partly! Samen; ponds near Gapdia, *Schimper*, 765! Dehli-Dikeno, *Schimper*, 1589! and without precise locality, *Schimper*, 14! 24! 317!

Mozamb. Dist. Zanzibar, *Taylor!* German East Africa: Karagwe; Bukoba, *Stuhlmann*, 1099! Harigae (?), *Fischer*, 636!

Also in St. Helena, Asia (except Siberia), and Australia.

10. **P. atronervatus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 535. Stem clothed $\frac{1}{4}$–$\frac{3}{4}$ its length by leaf-sheaths, at the base decumbent, creeping and rooting 3–6 in., but there are seedlings coming into flower also. Leaves 4–7 by $\frac{1}{8}$ in. Spike solitary, of 3–8 spikelets; bracts 3, lowest 2–4 in. long, similar to the leaves. Spikelets $\frac{1}{2}$ by $\frac{1}{6}$–$\frac{1}{5}$ in., 10–18-flowered, compressed. Glumes ovate, obtuse, green with 4 black nerves on each side. Nut $\frac{1}{2}$ the length of the glume, obovoid, biconvex, black.—*Cyperus atronervatus*, Boeck. in Linnæa, xxxviii. 358; Engl. Hochgebirgsfl. Trop. Afr. 139.

Nile Land. Abyssinia: Begemeder; Gafat, 9000 ft., *Schimper*, 1287! Gerra, 8000 ft., *Schimper*, 1244!

11. **P. Mundtii,** *Nees in Linnæa*, ix. 283, x. 131. Stem clothed with leaf-sheaths for $\frac{1}{4}$–$\frac{3}{4}$ its length, 8–16 in. long (sometimes exceeding 2 feet, robust), at the base decumbent, creeping and rooting for 3–10 in. Leaves 4–10 by $\frac{1}{6}$–$\frac{1}{5}$ in. broad, sometimes $\frac{1}{4}$ in. broad. Umbel of spikes simple (rarely subcompound or reduced to 1 head), rays often rather numerous; bracts similar to the leaves, usually overtopping the umbel, and (if the rays are numerous) 4–6 or more. Spikes of 3–8 spikelets, brown, ebracteolate. Spikelets $\frac{1}{3}$ by $\frac{1}{8}$ in., 12–16-flowered, but varying much in depth of colour and in width (in Ascherson, 530, they are $\frac{1}{2}$ by $\frac{1}{12}$ in.). Glumes ovate, obtuse, close-packed (less so in Ascherson, 530). Nut scarcely half the length of the glume, obovoid, biconvex, covered by raised dots.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 539, and in Dyer, Fl. Cap. vii. 157; Rendle in Cat. Afr. Pl. Welw. ii. 106. *Cyperus Mundtii*, Kunth, Enum. ii. 17; Boeck. in Linnæa, xxxv. 448, and in Flora, 1879, 545; Ridley in Trans. Linn. Soc. ser. 2,

Bot. ii. 125; K. Schum. in Engl. Pfl. Ost-Afr. C. 117. *C. densifolius*, Nees ex Kunth, Enum. ii. 114; Steud. Syn. Pl. Glum. ii. 6. *A. distichophyllus*, Steud. in Flora, 1842, 582, and Syn. Pl. Glum. ii. 11; Boeck. in Linnæa, xxxv. 488. *C. turfosus*, Krauss in Flora, 1845, 754; Daveau in Bull. Soc. bot. France, xli. (1894) 279; Salzmann ex Kunth, Enum. ii. 7. *C. Eragrostis*, A. Rich. Tent. Fl. Abyss. ii. 475; Wilk. & Lange, Fl. Hisp. i. 138; Schweinf. Beitr. Fl. Aethiop. 215; Kunth, Enum. ii. 7 in Obs.; Engl. Hochgebirgsfl. Trop. Afr. 138 partly; not of Vahl.

Nile Land. Abyssinia: Tigre; near Adowa, *Schimper*, 745! Begemeder, *Schimper*, 344! and without precise locality, *Schimper*, 760! British East Africa; White Nile, at the mouth of the River Sobat, *Schweinfurth*, 1116! Bahr et Ghazal, at the mouth of the Bahr el Arab, *Schweinfurth*, 1119! Uganda, *Stuhlmann*, 1374!

Lower Guinea. Angola: Mossamedes; by the Lake of Giraul, 1000 ft., *Welwitsch*, 6885! Loanda, 1000 ft., *Welwitsch*, 7092! Golungo Alto; by the River Casabella, *Welwitsch*, 7092B! Pungo Andongo; by streams in the Præsidium, near Cabonda, 3500 ft., *Welwitsch*, 6926!

South Central. Lunda: Mukenge, *Pogge*, 1581!

Mozamb. Dist. German East Africa: Karagwe; Bukoba, *Stuhlmann*, 998! Unyamwezi; Tabora, *Stuhlmann*, 520! British Central Africa: Nyasaland; Shiré Highlands, *Buchanan*, 56! and without precise locality, *Buchanan*, 463! 1001!

Throughout Africa, the Mascarene Islands, and in Spain.

This common African plant has been continually mixed with *P. Eragrostis* ever since Hochstetter issued Schimper, 760, as *Cyperus Eragrostis*. The two species are evidently allied, very alike in habit and leaves, but separated at a glance by the spikelets, which are turgid in *P. Eragrostis*.

12. **P. nitens,** *Nees in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 53. Annual. Stems cæspitose, $\frac{1}{2}$–12 in. long, rather slender. Leaves basal, often as long as the stem, $\frac{1}{12}$ in. broad, weak. Umbel simple, rays 1–6; bracts 3–6, lowest $\frac{1}{2}$–6 in. long, similar to the leaves. Spikelets 5–30 in a spike $\frac{1}{4}$–$\frac{1}{2}$ by $\frac{1}{12}$ in., 8–44-flowered, straw-coloured or pale brown. Glumes ovate, boat-shaped, 3–5-nerved on the keel, in the common form, usually with a curved mucro, in the African examples nearly muticous. Nut minute, $\frac{1}{3}$–$\frac{2}{5}$ the length of the glume, obovoid, pale brown.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 591, and in Durand & Schinz, Conspect. Fl. Afr. v. 539; Urban, Symb. Antill. ii. 16; Rendle in Cat. Afr. Pl. Welw. ii. 108. *Cyperus pumilus*, Linn. Amœn. Acad. iv. 302, Sp. Pl. ed. 2, 69, and herb. propr.; Kunth, Enum. ii. 4 (only in small part); C. B. Clarke in Journ. Linn. Soc. xxi. 43; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 129; K. Schum. in Engl. Pfl. Ost-Afr. C. 118; not of Rottb. nor of Nees. *C. nitens*, Retz. Obs. v. 13 (?); Vahl, Enum. ii. 331; Kunth, Enum. ii. 3; Boeck. in Linnæa, xxxv. 483. *C. patens*, Vahl, Enum. ii. 334; Schumach. & Thonn. Beskr. Guin. Pl. 36; Kunth, Enum. ii. 16. *C. truncatulus*, Steud. in Flora, 1842, 581, and Syn. Pl. Glum. ii. 10. *C. laxiusculus*, Steud. Syn. Pl. Glum. ii. 14. *C. commutatus*, Steud. Syn. Pl. Glum. ii. 10. *C. terminalis*, Steud. Syn. Pl. Glum. ii. 5. *C. squarrosus*, Kotschy ex C. B. Clarke in Journ. Linn. Soc. xxi. 45. *Dichostylis nitens* and *D. patens*, Palla in Engl. Jahrb. x. 296.

Upper Guinea. Senegambia, *Heudelot*, 331½! *Leprieur*, 7!

Nile Land. Kordofan: Abu Gerad, *Kotschy*, 53! and without precise locality, *Steudner*, 910! Abyssinia: Samen; near Gapdia, *Schimper*, 821! British East Africa: by the River Tana, *Gregory*, 97! Rabai Hills, near Mombasa, *Taylor!*

Lower Guinea. Angola: Loanda; at Represa de Maghalaes, near Conceicao, *Welwitsch*, 7076! Pungo Andongo; Catete and Umbilla, *Welwitsch*, 6907! between the Præsidium and Quilanga, *Welwitsch*, 6921! Mossamedes; banks of the River Bero, *Welwitsch*, 6888! Huilla, 5000 ft.; in fields near Lopollo, *Welwitsch*, 6854! plentiful in damp fields, *Welwitsch*, 6879B!

Mozamb. Dist. German East Africa: Kilimanjaro, 5000 ft., *Taylor!* British Central Africa: Zambesi Valley; Boruma, *Menyharth*, 1051 partly!

Also in Socotra, India, China, Malaya and North Australia.

The huge synonomy of this plant has grown up from Cyperologists giving importance to the length of the mucro to the glume. In this, as in several other species of the Order, it is a character of no value.

13. **P. pumilus,** *Nees in Linnæa*, ix. 283. Annual; stems cæspitose, 2–10 in. long. Leaves basal, often as long as the stem, $\frac{1}{10}$–$\frac{1}{6}$ in. broad. Umbel of spikes simple, rays 4–7; bracts 3–5, lowest up to 6 in. long, similar to the leaves. Spikelets 5–10 in a spike, $\frac{1}{3}$ by $\frac{1}{8}$ in., 8-flowered, much compressed, straw-coloured or pale brown, glistening. Glumes broad-ovate, keel excurrent in a mucro, strongly 2–3-ribbed on each face. Nut $\frac{1}{2}$–$\frac{2}{3}$ the length of the glume, ellipsoid, flat, ashy-black.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 591. *Cyperus hyalinus*, Vahl, Enum. ii. 329; Kunth, Enum. ii. 3; Boeck. in Linnæa, xxxv. 482. *C. pumilus*, Nees in Wight, Contrib. 74, excl. all syn.; Kunth, Enum. ii. 4 mostly, not of Linn.

Mozamb. Dist. Mozambique, *Kuntze*, 303!

Also in Madagascar, South India and Timor.

It is unfortunate that, in transferring this species and the last to *Pycreus*, Nees should have interchanged their Linnean specific names under *Cyperus*. The species is a striking one; plentiful in the Linnean and old collections; then hardly collected for a century; now very rarely received.

14. **P. polystachyos,** *Beauv. Fl. Owar.* ii. 48, *t.* 86, *fig.* 2. Roots fibrous. Stems tufted, 1–2½ ft. long. Leaves basal, longer or shorter than the stem, $\frac{1}{8}$–$\frac{1}{5}$ in. broad. Spikes (more or less evidently compound) in an umbel of 1–7 rays, each of 10–50 spikelets (but see var. β), erect even in fruit; bracts 3–6, lowest 4–12 in. long, similar to the leaves. Spikelets $\frac{2}{3}$ by $\frac{1}{12}$ in., linear, not wider towards the base, 20–50-flowered, dusky straw-coloured or somewhat red-tinged. Glumes ovate, tip triangular, muticous. Nut $\frac{1}{2}$–$\frac{3}{5}$ the length of the glume, oblong, nearly symmetric, brown.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 592, in Durand & Schinz, Conspect. Fl. Afr. v. 540, and in Dyer, Fl. Cap. vii. 157; Durand & Schinz, Études Fl. Congo, i. 281; Urban, Symb. Antill. ii. 17; Rendle in Cat. Afr. Pl. Welw. ii. 108. *Cyperus polystachyos*, R. Br. Prod. 214; Kunth, Enum. ii. 13; Benth. in Hook. Niger Fl. 549; Krauss in Flora, 1845, 754; Boeck. in Linnæa, xxxv. 477, in Flora, 1879, 547 incl. var., and in Peters, Reise Mossamb. Bot. 535; Coss. & Durieu, Expl. Scient.

Algér. Glum. 253; Aschers. & Schweinf. Ill. Fl. Égypte, 155; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 127. *C. odoratus*, Linn. Sp. Pl. ed. 1, 46, ed. 2, 68, and herb. propr. mainly. *C. intactus*, Vahl, Enum. ii. 332; Kunth, Enum. ii. 14. *C. Sonderi*, J. A. Schmidt, Beitr. Fl. Cap. Verd. Ins. 162. *C. complanatus*, Steud. Syn. Pl. Glum. ii. 3 partly. *C. elongatus*, Steud. l.c. 11. *C. tetraphyllus*, Beauvois ex Kunth, Enum. ii. 13. *C. protractus*, Delile, Fl. Aegypt. Ill. 50.

Upper Guinea. Senegambia, *Leprieur! Heudelot*, 444! Cape Verd Islands: St. Nicolao, *Bolle!* Sierra Leone, *Vogel!* Liberia: Cape Palmas, *Ansell!* Monrovia, *Herb. Berlin!* Gold Coast: Accra, Brown, 30! Niger Territory: banks of the River Nun (Niger), *Mann*, 530! *Vogel*, 11! and without precise locality, *Vogel*, 35!

Nile Land. British East Africa: Bahr el Ghazal, *Schweinfurth*, 1152! Tsimba (Shimba) Hills, *Taylor!*

Lower Guinea. Gaboon River, *Jardin*, 43! Princes Island: higher part of Pico de Papagaio, *Welwitsch*, 7032! Lower Congo, *Smith*, 14! 25! Angola: Ambriz, in marshy places, *Monteiro! Welwitsch*, 7041! Loanda; by ponds on the Island of Cazanga, *Welwitsch*, 7081! Golungo Alto; banks of the River Quiapose, near Sange, *Welwitsch*, 7100! Pungo Andongo; in marshy meadows, *Welwitsch*, 6927! Mossamedes; marshes near Aguadas, *Welwitsch*, 6890! on the banks of the River Caroca, *Welwitsch*, 6891! Huilla, *Newton*, 15! German South-west Africa: Hereroland, *Dinter*, 399!

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1069! *Stuhlmann*, 85! German East Africa: Usambara; Tanga, *Holst*, 2029! Portuguese East Africa: Cabaceira Peninsula, *Peters*, 21! British Central Africa: Zambesi Valley; Boruma, *Meyharth*, 1061! North Nyasaland, *Whyte!*

In tropical and warm temperate countries throughout the world, especially near the sea.

Var. *laxiflora*, Benth. Fl. Austral. vii. 261. Spikes open, subcorymbose or umbellate. Spikelets subsolitary, spreading horizontally, often yellow or somewhat brown-red.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 592, in Durand & Schinz, Conspect. Fl. Afr. v. 541, and in Dyer, Fl. Cap. vii. 158. *Cyperus globosus*, Boeck. in Flora, 1879, 546, not of Allioni.

Upper Guinea. Senegal, *Roger*, 39! *Adanson*, 172! Senegambia; near the River Jonware, *Brunner*, 165! and without precise locality, *Heudelot*, 498! Cape Verd Islands: St. Antao, *Gray!*

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 1462! Rabai Hills, near Mombasa, *Taylor!* Nyika country, near Mombasa, *Taylor!*

Lower Guinea. Angola: Huilla; Humpata, *Johnston!*

Mozamb. Dist. Zanzibar, *Kirk! Hildebrandt*, 1067! *Kuntze*, 210! 211!

In tropical and warm temperate countries throughout the world.

There occurs every gradation from the dense tassel-spikes of *P. polystachyos* type to the extreme form of the var. *laxiflora*. The favourite name for this abundant species with authors appears to be *Cyperus polystachyos*, Rottb., which I have doubtfully referred (in Hook. f. Fl. Brit. Ind. vi. 616) to *Cyperus subcapitatus*, C. B. Clarke. Whatever *C. polystachyos*, Rottb. may have been, as it had a trifid style, it was not our present species nor any *Pycreus*.

15. **P. Æthiops,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 534. Stems tufted, 8–16 in. long. Leaves $\frac{1}{2}$ as long as stem. Umbel simple; rays 0–$\frac{2}{3}$ in. long; bracts spreading horizontally.

Spikelets loosely spicate, much flattened, hard, shining black-chestnut-coloured. Glumes rigidly imbricate; keel yellowish or nearly black; otherwise as *P. polystachyos*, Beauv., var. *laxiflora*, Benth.—Rendle in Cat. Afr. Pl. Welw. ii. 109. *Cyperus Æthiops*, Welw. ex Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 129.

Lower Guinea. Angola: Huilla; in wet pastures near Ferrao da Sola, 5000 ft., *Welwitsch*, 6875!

In the genus *Pycreus* it has been usual to rely much on the colour of the spikelets for separating the closely-allied species. It must be recollected that in *Cyperus globosus*, Allioni, spikelets of every colour, from green to black, occur; and the present species might be made a variety of *P. polystachyos*.

16. **P. sulcinux,** *C. B. Clarke in Hook. f. Fl. Brit. Ind.* vi. 593. Annual. Stems 3–9 in. long, tufted. Leaves basal, often as long as the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad, weak. Spikes in a simple umbel 3–6 in. in diam.; rays 3–7; bracts 3–5, lowest exceeding the umbel, similar to the leaves. Spikelets 4–11 in the loose spike, up to $\frac{1}{2}$ by $\frac{1}{6}$ in., 8–28-flowered, flattened, straw-coloured to yellow. Glumes somewhat distant, ovate, subacute. Nut $\frac{2}{5}$ the length of the glume, oblong-obovoid, asymmetric, the face next the rhachilla being straight or somewhat concave.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 542. *Cyperus sulcinux*, C. B. Clarke in Journ. Linn. Soc. xxi. 56, and xxv. 80; K. Schum. in Engl. Pfl. Ost-Afr. C. 117.

Mozamb. Dist. British Central Africa: Nyasaland; Umbaka River, *Scott!* Zomba Rock, *Whyte!*

Also in India and Malaya.

The spikelets of the Nyasaland specimens are considerably finer and broader than anything hitherto referred to *P. polystachyos;* they are larger even than in *P. ferrugineus*.

17. **P. pelophilus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 540. Roots fibrous. Stems tufted, 1 ft. long, rather stout. Leaves basal, 8 by $\frac{1}{6}$ in., weak. Bracts 5, spreading, lowest up to 5 in. long similar to the leaves; rays of umbel about 7, up to 4 in. long; umbellules (secondary umbels) with rays 0–1 in. long. Spikelets 1 by $\frac{1}{10}$ in., yellowish, 12–30-flowered. Glumes ovate, hardly acute, rather distant in fruit. Style small, the 2 linear branches hardly exserted. Nut $\frac{1}{2}$ the length of the glume, obovoid, very 1-sided, black, much compressed, the faces almost concave.—Rendle in Cat. Afr. Pl. Welw. ii. 109. *Cyperus pelophilus*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 129.

Lower Guinea. Angola: Loanda, 1000 ft.; in dried-up places near Bemposta and near Cumano, *Welwitsch*, 7025! near Fort de Conceiçao, *Welwitsch*, 7082! Mossamedes, 1000 ft.; marshes near Giraul, *Welwitsch*, 6887! German South-west Africa: Hereroland, *Dinter*, 50!

18. **P. ferrugineus,** *C. B. Clarke in Hook. f. Fl. Brit. Ind.* vi. 593. Roots fibrous. Stems 1–2 ft. long, robust. Leaves $\frac{1}{2}$ the length of the stem, up to $\frac{1}{5}$ in. broad. Umbel 2–5 in. broad, simple or nearly

so. Spikelets numerous, loosely spicate, ferruginous, up to $\frac{2}{3}$ by $\frac{1}{6}$ in.; otherwise as *P. polystachyos*, Beauv. var. *laxiflora*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 536, and in Dyer, Fl. Cap. vii. 158; Urban, Symb. Antill. ii. 18. *Cyperus ferrugineus*, Poir. in Lam. Encycl. vii. 261; Kunth, Enum. ii. 11; K. Schum. in Engl. Pfl. Ost-Afr. C. 118. *C. polystachyos*, var. *ferrugineus*, Boeck. in Linnæa, xxxv. 479.

Mozamb. Dist. German East Africa: Karagwe; Bukoba, *Stuhlmann*, 3468!

Also in South Africa, the Mascarene Isles, and South-east Asia; also in the United States and Tropical America, if *Cyperus Nuttallii*, C. Sprengel, be considered = the Madagascar *Cyperus ferrugineus*, Poiret.

This plant altogether resembles *P. polystachyos*, var. *laxiflora*, except that its spikelets (glumes and nuts) are larger and brighter.

19. **P. Hildebrandtii,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 538. Roots fibrous. Stems 1 ft. long, rather stout. Leaves $\frac{2}{3}$ the length of the stem, up to $\frac{1}{6}$ in. broad. Umbel compound; primary rays 7, slender, $2\frac{1}{2}$ in. long; lowest bract up to 5 by $\frac{1}{6}$ in. Secondary umbels often of 3 very slender rays hardly $\frac{1}{3}$ in. long, ebracteolate. Spikes loose, of 7–20 spikelets. Spikelets $\frac{1}{2}$–$\frac{2}{3}$ by $\frac{1}{20}$–$\frac{1}{16}$ in., 10–30-flowered, bright brown; glumes rather distant, minute.—*Cyperus polystachyos*, var. *micans*, partly, C. B. Clarke in Journ. Linn. Soc. xxi. 54. *C. Hildebrandtii*, K. Schum. in Engl. Pfl. Ost-Afr. C. 118, not of Boeck.

Nile Land. British East Africa: Ozi, *Gregory!* Rabai Hills, near Mombasa, *Taylor!*

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1071!

This and the preceding 4 species may be treated as extreme forms of *P. polystachyos*, Beauv. *P. Hildebrandtii*, with its strong development and compound umbel, yet with excessively narrow spikelets and capillary rays, appears as distinct as any of the preceding 4.

20. **P. globosus,** *Reichb.* var. **nilagirica,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 537. Stolons 0. Stems 1–2 ft. long, annual or biennial, tufted. Leaves $\frac{2}{3}$ the length of the stem, rarely exceeding $\frac{1}{8}$ in. in breadth, much enrolled in all the dried examples. Umbel 1–6 in. in diam., simple or compound, or one compound head; bracts 3–5, lowest overtopping the inflorescence, similar to the leaves. Spikelets loosely spicate, $\frac{1}{4}$–$\frac{3}{4}$ by $\frac{1}{12}$–$\frac{1}{10}$ in., strongly compressed, from shining dark brown to nearly black, 8–30-flowered, with parallel sides. Glumes rigid, ovate, scarcely acute. Nut $\frac{1}{2}$ the length of the glume, ellipsoid, apiculate, nearly black, superficial cells small, quadrate.—*P. capillaris*, var. *nilagirica*, C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 592. *Cyperus nilagiricus*, Hochst. ex Steud. Syn. Pl. Glum. ii. 2; Boeck. in Linnæa, xxxv. 457. *C. globosus*, Boeck. in Flora, 1879, 546; K. Schum. in Engl. Pfl. Ost-Afr. C. 117. *C. polystachyos*, var. *ferruginea*, C. B. Clarke in Journ. Linn. Soc. xxi. 54 partly.

Upper Guinea. French Guinea: Farana, near the sources of the Niger,

3500 ft., *Scott-Elliott*, 5334! Cameroons: Yaunde, 2600 ft., *Zenker & Staudt*, 336!

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 1462! Buddu district, *Scott-Elliot*, 7516!

South Central. Congo Free State: Ntenke, *Briart!*

Mozamb. Dist. German East Africa: Urundi district, 4000–5000 ft., *Scott-Elliot*, 8182! British Central Africa: Nyasaland; Shire Highlands, *Buchanan! Scott-Elliot*, 8508! and without precise locality, *Buchanan*, 1452!

Also in Bourbon, South-east Asia, Malaya and Australia.

The species *nilagiricus* was originally grounded on the black-chestnut colour, while my var. *nilagirica* includes all the narrow spikeleted heads whatever the colour. All the Tropical African material has narrow spikelets with exactly parallel sides, and is chestnut-brown to chestnut-black. *P. betschuanus* differs in the prominent long stolons. The Cameroon plant, issued from Berlin as *Cyperus globosus*, Allioni is exactly the common form of *C. nilagiricus* in India.

21. **P. propinquus,** *Nees in Mart. Fl. Bras.* ii. i. 7. Stolons 0 Stems 12–18 in. long, rather slender. Leaves nearly as long as the stems, $\frac{1}{8}$ in. broad. Spikelets 10–16 in one compound head, pale yellow; bracts 3, lowest 3–7 in. long and similar to the leaves. Spikelets $\frac{1}{2}$ by $\frac{1}{8}$ in., 20–36-flowered, compressed, sides parallel. Glumes ovate, one-coloured, hardly acute, a little inflated. Nut $\frac{2}{5}$ the length of the glume, obovoid, apiculate, chestnut-coloured, not transversely muricate.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 541; Durand & Schinz, Études Fl. Congo, i. 281; Urban, Symb. Antill. ii. 18. *P. monocephalus*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 538. *Cyperus lanceolatus*, Poir. in Lam. Encycl. vii. 245; Kunth, Enum. ii. 9; Boeck. in Linnæa, xxxv. 442; C. B. Clarke in Journ. Linn. Soc. xx. 279 and xxi. 42; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 125; not of Presl. *C. olfersianus*, Kunth, Enum. ii. 10; Boeck. in Linnæa, xxxv. 439; C. B. Clarke in Journ. Linn. Soc. xxi. 62 partly; not *Pycreus olfersianus*, Nees. *C. pycnocephalus*, Steud. Syn. Pl. Glum. ii. 5. *C. fluminalis*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 127; Rendle in Cat. Afr. Pl. Welw. ii. 106. *C. flavescens*, var. *abyssinica*, C. B. Clarke in Journ. Linn. Soc. xx. 279.

Upper Guinea. Senegal, *Perrottet!* Sierra Leone, *Scott-Elliot*, 5187A! Cameroons: Yaunde, 2600 ft., *Zenker & Staudt*, 335!

Lower Guinea. Mouth of the Congo, *Smith*, 62! Lower Congo: by the River Ntombi, near Lutete, 1500 ft., *Hens*, A, 250!

South Central. Congo Free State, *Butaye!*

Mozamb. Dist. British Central Africa: Nyasaland; Namasi, *Cameron* 24!

Also in the Mascarene Islands and Tropical America.

I can only tell this species from 1-headed examples of *P. flavescens*, Reichb., by the nut being perfectly smooth, i.e. without a trace of longitudinal superficial cells (and consequent transverse markings) which mark the nut of *P. flavescens*.

22. **P. capillifolius,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 535. Annual. Stems tufted, 4–8 in. long, very slender.

Leaves as long as the stem, capillary or nearly so. Head 1, lateral, of 4–18 spikelets; bracts 2, the lower 1–2½ in. long, as though continuing the stem. Spikelets ½–¾ by $\frac{1}{10}$ in., 10–30-flowered, pale yellow. Glumes ovate, inflated, hardly acute. Nut ½ the length of the glume, obovoid, black, smooth, without longitudinal cells or transverse murication.—Rendle in Cat. Afr. Pl. Welw. ii. 107. *Cyperus capillifolius*, A. Rich. Tent. Fl. Abyss. ii. 475; K. Schum. in Engl. Pfl. Ost-Afr. C. 117. *C. Afzelii*, Boeck. in Linnæa, xxxv. 475, and in Flora, 1879, 547 (var. *capillifolia*, partly); C. B. Clarke in Journ. Linn. Soc. xxi. 62; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 127. *C. flavescens*, T. Thoms. in Speke, Nile, Append. 653; Oliver in Trans. Linn. Soc. xxix. 164.

Upper Guinea. Sierra Leone, *Afzelius!*

Nile Land. Abyssinia: Shireh; Kouaieta (Kuayata), *Quartin-Dillon!* British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 1948! slopes of Madi rocks, *Speke & Grant!*

Lower Guinea. Angola; *Welwitsch*, 6907 partly! Pungo Andongo, 3500 ft., *Welwitsch*, 6919!

23. **P. smithianus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 542. Rhizome sometimes 8 in. long. Stems 1 ft. long, tough, with a bulb ¼–⅓ in. in diam. at the base. Leaves as long as the stem, ⅛–⅙ in. broad, rather stiff. Inflorescence of 30–40 white spikelets nearly condensed into a head 1⅓ in. in diam.; rays hardly attaining ¼ in. in length, bracts 4–5, lowest 6 in. long and similar to the leaves. Spikelets closely spicate, ½ by $\frac{1}{10}$ in., compressed, 14–22-flowered. Glumes ovate, obtuse, one-coloured, not rigid. Nut ½ the length of the glume, obovoid, apiculate, brown, smooth.—Durand & De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 88; Durand & Schinz, Études Fl. Congo, i. 282. *Cyperus smithianus*, Ridley in Journ. Bot. 1884, 15; K. Schum. in Engl. Pfl. Ost-Afr. C. 117.

Lower Guinea. Mouth of the Congo, *Smith!* Lower Congo: near the mouth of the River Kwa, 1000 ft., *Hens*, C, 116! *Dewèvre*, 706! Stanley Pool, *Luja*, 56! Kinshassa, *Luja*, 184!

Mozamb. Dist. German East Africa: Karagwe; Bukoba, *Stuhlmann*, 1593, 3960!

24. **P. cuanzensis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 536. Stem 15 in. long, at the base decumbent, not at all thickened, with lax brown shining sheaths. Leaves greatly exceeding the stem in length, ⅙–⅕ in. broad, flaccid. Inflorescence of 30–40 white spikelets nearly condensed into a head 1⅓ in. high; rays 0–½ in. long; bracts 4–5, lowest attaining 10 in. or more. Spikelets undistinguishable from those of *P. smithianus*.—Rendle in Cat. Afr. Pl. Welw. ii. 108. *Cyperus cuanzensis*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 128.

Upper Guinea. Cameroons: Batanga, among rocks by the River Lobe, left bare by low water, *Bates*, 323! Bipinde, *Zenker*, 1935!

Lower Guinea. Angola: Pungo Andongo; marshy meadows by the River Cuanza, near Nbilla, 3500 ft., *Welwitsch*, 6899!

The inflorescence, spikelets and nuts appear to me so identical with those of *P. smithianus*, from the same locality, that I cannot but suspect they are one species. The diversity in the base of the stem is so striking that more material must be awaited before uniting the two.

25. **P. minimus,** *C. B. Clarke.* Roots fibrous. Stems $1\frac{1}{3}$ in. long, weak. Leaves 1 by $\frac{1}{16}$–$\frac{1}{12}$ in., weak. Umbel $\frac{1}{2}$ in. in diam., of 6–9 spikelets; rays 2–3, 0–$\frac{1}{4}$ in. long; bracts 2–3, lowest $\frac{1}{2}$ in. long and similar to the leaves. Spikes of 2–4 spikelets. Spikelets $\frac{1}{5}$ by $\frac{1}{25}$ in., chestnut, 6–12-flowered. Glumes ovate, not acute, rather distant, keel green. Style slender; branches 2, long, linear. Nut $\frac{3}{5}$ the length of the glume, ellipsoid, compressed laterally, brown; superficial cells minute square.—*Cyperus minimus*, K. Schumann MS., non Thunb.

Nile Land. British East Africa: Rabai Hills, near Mombasa, *Taylor!*

Mozamb. Dist. Zanzibar, *Stuhlmann*, i. 65!

26. **P. melas,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 538. Annual. Stems 2–6 in. long, tufted, almost setaceous. Leaves $\frac{1}{2}$–$\frac{3}{4}$ the length of the stem, almost setaceous. Umbel of 5–10 spikelets, nearly contracted into a head; rays 1–4, 0–$\frac{2}{5}$ in. long; bracts 2–3, lowest 2 in. long, similar to the leaves. Spikelets 2–4 together, almost digitate, $\frac{2}{5}$ by $\frac{1}{16}$ in., 8–30-flowered, black-chestnut, with parallel sides. Glumes ovate, obtuse, chestnut, narrowly scarious-yellow on the margins. Style small, the two linear branches hardly exserted. Nut $\frac{2}{3}$ the length of the glume, ellipsoid, apiculate, ashy black; superficial cells small, square.—Rendle in Cat. Afr. Pl. Welw. ii. 108.

Lower Guinea. Angola: Pungo Andongo; 3500 ft.; marshy places near Lombe, *Welwitsch*, 6913! Mutollo, Serra de Guinga, *Welwitsch*, 6914! 7154! Huilla; lofty pastures of Morro de Lopollo, 5000 ft., *Welwitsch*, 6871!

27. **P. elegantulus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 536. Annual. Stems 8–28 in. long. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{10}$–$\frac{1}{6}$ in. broad. Umbel of 1–7 dense compound spikes, often 1-headed, but rays sometimes 2–3 in.; bracts 3–5, lowest 3–9 in. long, similar to the leaves. Spikes dense, of 5–30 spikelets, (several often congested, forming a mass of 80 spikelets or more), ebracteolate. Spikelets $\frac{1}{4}$–$\frac{2}{3}$ by $\frac{1}{12}$ in., 6–16-flowered, much compressed, hard. Glumes ovate, keeled, subobtuse, uniformly black-chestnut, not nerved on the sides, the keel broad green. Style short, the two branches hardly exserted. Nut $\frac{1}{2}$–$\frac{3}{5}$ the length of the glume, obovoid, apiculate, smooth, the superficial cells minute square.—*Cyperus melanocephalus*, R. Br. in Salt, Abyss. Append. iv. 63 name only. *C. elegantulus*, Steud. in Flora, 1842, 583, and Syn. Pl. Glum. ii. 11; Hook. f. in Journ. Linn. Soc. vii. 224 ?; K. Schum. in Engl. Pfl. Ost-Afr. C. 117. *C. atronitens*, Hochst. in Flora, 1841, i. Intell. 20; A. Rich. Tent. Fl. Abyss. ii. 476; Boeck. in Linnæa, xxxv. 456; Schweinf. Beitr. Fl. Aethiop. 215, and in Bull. Herb. Boiss. ii. Append. ii. 46, 102; C. B.

Clarke in Journ. Linn. Soc. xxi. 66. *C. cimicinus*, Presl, Rel. Haenk. i. 166. *C. ischnocormis*, Steud. Syn. Pl. Glum. ii. 11. *C. Eragrostis*, Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 46, 102.

Upper Guinea. Fernando Po, 8500 ft., *Mann*, 1470!

Nile Land. By the Nile between Khartoum and Shendy, *Bromfield!* Eritrea: Belta Felkat, 4900 ft., *Schweinfurth & Riva*, 1050! near Saganeiti, 7200 ft., *Schweinfurth & Riva*, 1735! Deghorra Valley, near Saganeiti, 7200 ft., *Schweinfurth & Riva*, 1779! Acrur, 6000 ft., *Schweinfurth & Riva*, 1773! Abyssinia: Tigre; Sholoda Mountain, *Schimper*, 25! Mettgalo Mountain, *Schimper*, 845! near Adowa, *Schimper*, 312! Samen; marshes near Demerki, *Schimper*, 574! Mount Bachit, *Schimper*, 118! Begemeder; Senka Berr, on the River Reb, 7000 ft., *Schimper!* Magdala, *Steudner*, 925! 928! Lotho, *Schimper*, 470! Dehli-Dikeno, 4000 ft., *Schimper*, 272! Shoa; Ankober, *Roth!* and without precise locality, *Schimper*, 505! 965! 1245! *Quartin-Dillon & Petit!*

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 5000 ft., *Volkens*, 653! 691! 761! *Taylor!* Usambara; Heboma, *Holst*, 2553! Karagwe; Ihangiro, *Stuhlmann*, 3342! British Central Africa: North Nyasaland, *Whyte!* Mount Zomba, 4000–6000 ft., *Whyte!*

Also in Natal and Tropical America.

The South American *Cyperus cimicinus*, Presl, is identical with the African *P. elegantulus*.

28. **P. umbrosus,** *Nees in Linnæa*, x. 130. Stronger than any of the preceding species, the Tropical African examples large. Stolons (in *Schweinfurth*, 1219) exceeding 12 by $\frac{1}{3}$ in., clothed with ovate black-brown scales 1 in. long. Stems up to 12–18 in. long. Leaves exceeding the stem, $\frac{1}{6}$ in. broad; sheaths fleshy with transverse lineolations. Umbel subsimple; rays 3–7, up to 2 in. long, stout; bracts 4, lowest 6 in. long, similar to the leaves. Spikes of 3–8 spikelets, loosely or closely spicate, ebracteolate. Spikelets up to $\frac{1}{2}$ by $\frac{1}{6}$ in., 16-flowered, brown to chestnut-black, compressed. Glumes ovate, obtuse, one-coloured, not nerved on the sides, keel yellowish-brown or green. Style shorter than the nut; branches 2, shortly exserted. Nut $\frac{1}{4}$ the length of the glume, obovoid, dark-brown, smooth.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 543, and in Dyer, Fl. Cap. vii. 158; Rendle in Cat. Afr. Pl. Welw. ii. 107. *Cyperus lanceus*, Thunb. Prodr. 18, and Fl. Cap. ed. Schult. 101; Kunth, Enum. ii. 8, excl. vars. β, γ; K. Schum. in Engl. Pfl. Ost-Afr. C. 117. *C. melanopus*, Boeck. in Flora, 1879, 545. *C. brunneo-ater*, Boeck. in Engl. Jahrb. v. 498. *C. fulvus*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 126; Engl. Hochgebirgsfl. Trop. Afr. 138.

Nile Land. British East Africa: by the Bahr el Ghazal, near the Nuer villages, *Schweinfurth*, 1219!

Lower Guinea. Angola: Huilla; 5000 ft., damp places between Lopollo and Eme, *Welwitsch*, 6872! near the river in Lopollo district, *Welwitsch*, 6881!

Mozamb. Dist. Zanzibar, *Taylor!*

Also in South Africa and Madagascar.

I have described above from the Tropical African plant, which is considerably larger and more fleshy than the Cape rigid form. Boeckeler esteems Schweinfurth,

1219, specifically different; but Taylor's example is still larger with a compound umbel.

Var. *Grantii*, C. B. Clarke. Glaucescent. Umbels contracted, 1 in. in diam.; lowest bracts 4 in. long.—*C. lanceus*, T. Thoms. in Speke, Nile, Append. 654. *C. nitidus*, Boeck. in Linnæa, xxxv. 461 partly; Oliv. in Trans. Linn. Soc. xxix. 164. *C. lanceus*, var ? β *Grantii*, C. B. Clarke in Journ. Linn. Soc. xxi. 66.

Nile Land. Ruwenzori, *Scott-Elliot*, 7516 !

Mozamb. Dist. German East Africa: at Jiwa la Mkoa, in the Mgunda Mkhali, *Speke & Grant !* British Central Africa: Urundi; Lake Tanganyika, *Carson*, 54 ! Nyasaland; Namasi, *Cameron*, 21 !

29. **P. nyasensis,** *C. B. Clarke.* Stem 1 ft. long, slender, with 1 head. Spike loose, of 3–8 spikelets; bracts 2, the lower 2 in. long, spreading. Spikelets $\frac{3}{5}$ by $\frac{1}{5}$ in., compressed, linear-oblong, 20-flowered, with parallel sides, a rich brown colour. Glumes elliptic, obtuse, subobtuse, 1-coloured, rather closely imbricate. Style-branches 2. Nut rather large, obovoid, white-reticulate; superficial cells hexagonal, lax.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Zomba, 4000–6000 ft., *Whyte !*

The examples are without rhizome or leaves.

30. **P. spissiflorus,** *C. B. Clarke in Trans. Linn. Soc. ser. 2, Bot.* iv. 53. Rhizome woody. Stem 1 ft. long; basal sheaths black, somewhat lacerate. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Umbel simple, with rays 0–$1\frac{1}{3}$ in. long, or congested into a head; bracts 3–5, lowest up to 3 in. long, similar to the leaves. Spikes loose, of 3–9 spikelets. Spikelets $\frac{1}{3}$ by $\frac{1}{8}$ in., compressed, brownish-yellow, 16–20-flowered. Glumes closely-packed, elliptic, obtuse, submucronate. Style 2-fid.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 542. *Cyperus spissiflorus*, K. Schum. in Engl. Pfl. Ost-Afr. C. 117.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Mlanji, *Whyte !*

This resembles some forms of *P. globosus*, Reichb., but differs in the woody rhizome.

31. **P. betschuanus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 535. Stolons hardening into a slender rhizome, seen 3 in. long. Stems 4–12 in. long. Leaves $\frac{1}{2}$ the length of the stem, $\frac{1}{8}$ in. broad. Umbel $\frac{1}{2}$–$2\frac{1}{4}$ in. broad, simple or of 1 head; rays 3–5; bracts 3, lowest 2–4 in. long, similar to the leaves. Spikes of 4–8 spikelets, shortly spicate. Spikelets $\frac{1}{2}$ by $\frac{1}{12}$ in., lanceolate, much compressed, hard, shining chestnut-coloured, 16–22-flowered. Glumes very tightly packed, ovate, subobtuse; keel yellowish. Nut scarcely $\frac{1}{2}$ the length of the glume; superficial cells hexagonal-subquadrate.—C. B. Clarke in Dyer, Fl. Cap. vii. 159. *Cyperus betschuanus*, Boeck. in Engl. Jahrb. xi. 406. *C. globosus*, var. *nilagirica*, C. B. Clarke in Journ. Linn. Soc. xxi. 49.

Mozamb. Dist. British Central Africa: Mashonaland, *Bryce !*

Also in South Africa.

32. **P. angulatus,** *Nees in Linnæa,* ix. 283. Rhizome slender. Stem 1–3 ft. long. Leaves $\frac{1}{2}$ the length of the stem, $\frac{1}{8}$–$\frac{1}{4}$ in. broad. Umbel simple or rarely reduced to 1 head; rays 3–8; bracts 4–5, lowest up to 6–10 in. long, similar to the leaves. Spikes of 3–20 spikelets, loose. Spikelets up to $\frac{2}{3}$ by $\frac{1}{5}$ in., 22-flowered, compressed, yellow-brown. Glumes ovate, keeled, a little inflated; tip triangular; margins crisped-undulate. Nut $\frac{1}{4}$–$\frac{1}{3}$ the length of the glume, obovoid, black.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 593, in Durand & Schinz, Conspect. Fl. Afr. v. 534, and in Dyer, Fl. Cap. vii. 156, 160; Urban, Symb. Antill. ii. 19. *Cyperus angulatus,* Nees in Wight, Contrib. 73; Boeck. in Linnæa, xxxv. 465.

Mozamb. Dist. British Central Africa: Rhodesia; Leshumo Valley, south of the Zambesi, *Holub!* Nyasaland; Namasi, *Cameron,* 22!

Also in South Africa, India, Australia, and Tropical America.

This species occurs in Natal and the Transvaal, and is very likely to occur in Tropical Africa, whether Holub's example is rightly named or no; and has therefore been included in this Flora. Holub's specimens are 5–7 in. high only, with a single loose head of 4 large spikelets on each. The woody stem and spikelets do very well for an extremely depauperated *P. angulatus;* but the flowers are quite young and the identification altogether uncertain.

33. **P. albomarginatus,** *Nees in Mart. Fl. Bras.* ii. i. 9. A large annual. Stem solitary, 1–3 ft. high, triquetrous at the top, smooth. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{4}$–$\frac{1}{3}$ in. broad. Umbel usually compound; primary rays 3–11 up to 1–7 in. long; bracts 3–6, lowest up to 8–18 in. long, similar to the leaves. Spikes subglobose, $1\frac{1}{4}$ in. long, of 12 spikelets, or very loose, elongate, 2 in. long, of 8–10 spikelets. Spikelets up to $1\frac{1}{4}$ by $\frac{1}{6}$ in., flattened, straw-coloured or yellow, 18–30-flowered. Glumes ovate, obtuse, distant, with white margins. Nut $\frac{2}{3}$ the length of the glume, up to $\frac{1}{12}$ in. long, compressed, ellipsoid, black.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 594, and in Durand & Schinz, Conspect. Fl. Afr. v. 534; Durand & Schinz, Études Fl. Congo, i. 280; Rendle in Cat. Afr. Pl. Welw. ii. 107. *Cyperus Hochstetteri,* Krauss in Flora, 1845, 755 in note; Boeck. in Linnæa, xxxv. 471, and in Flora, 1879, 546; C. B. Clarke in Journ. Linn. Soc. xx. 282, and xxi. 69, incl. vars. β, γ; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 126. *C. retusus,* Steud. in Flora, 1842, 582, and Syn. Pl. Glum. ii. 11 partly; A. Rich. Tent. Fl. Abyss. ii. 485, not of Nees. *C. albomarginatus,* Steud. Syn. Pl. Glum. ii. 10. *C. argyræus,* Steud. Syn. Pl. Glum. ii. 11. *C. patuliflorus,* Boeck. in Linnæa, xxxv. 473, and in Flora, 1879, 546. *C. esculentus,* Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 138 partly.

Upper Guinea. Senegal, *Perottet,* 876! *Roger,* 20! 39! Senegambia, *Heudelot,* 537! Galam, *Heudelot,* 316! Bakel, *Heudelot,* 317!

Nile Land. Kordofan: near Abu Gerard, *Kotschy,* 52! Galabat; region of Matamma, *Schweinfurth,* 2012! Abyssinia: near Gafta, *Schimper,* 1199! Efak, near Lake Tana, *Schimper,* 1551! British East Africa: Jur; Jur Ghattas, *Schweinfurth,* 1939! 2018! 2082!

Lower Guinea. Lower Congo: Boma, *Hens,* 392! Angola: Loanda; near Teba and Quicuxe, *Welwitsch,* 7046! and fruit, 1072! Pungo Andongo: Lagoa de

Quibinda, Sansamanda, and Quitaje ad Cuije, *Welwitsch*, 6907 partly! on islands at the cataract of the River Cuanza, near Condo, *Welwitsch*, 6938!

South Central. Congo Free State: Baugala, *Hens*, 35!

Mozamb. Dist. Portuguese East Africa: Quilimane, *Stuhlmann*, 78! British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 62! plains of Zomba, 2500–3000 ft., *Whyte!*

Also in the Mascarene Isles, India and Australia.

34. **P. tremulus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 542. A large annual. Stem solitary, 1–3 ft. high, triquetrous at the top, smooth. Umbel usually compound, with very numerous spikelets; bracts 4–7, lowest often exceeding 12 by $\frac{1}{4}$ in. Spikelets $\frac{1}{2}$–$\frac{2}{3}$ by $\frac{1}{10}$ in., 14–20-flowered. Nut scarcely $\frac{1}{20}$ in. long; otherwise resembling *P. albomarginatus* (differing in the slender spikelets).—C. B. Clarke in Journ. Bot. 1897, 72; Durand & Schinz, Études Fl. Congo, i. 282. *Cyperus tremulus*, Poir. in Lam. Encycl. vii. 264; Kunth, Enum. ii. 16; Boeck. in Linnæa, xxxv. 469, and in Peters, Reise Mossamb. Bot. 535; K. Schum. in Engl. Pfl. Ost-Afr. C. 117. *C. chlorostachys*, Boeck. in Peters, Reise Mossamb. Bot. 540, and in Linnæa, xxxvi. 293; K. Schum. in Engl. Pfl. Ost-Afr. C. 120.

Nile Land. British East Africa: Uganda, *Stuhlmann*, 4610!

South Central. Equatorville, 1000 ft., *Hens*, C, 358!

Mozamb. Dist. Mozambique, *Peters*, 22! British Central Africa: Nyasaland; Kondowe to Karonga, 2000–6000 ft., *Whyte!*

Also in the Mascarene Islands.

3. **JUNCELLUS**, C. B. Clarke in Hook. f. Fl. Ind. vi. 594.

Spikes umbelled or congested into a head or solitary. Spikelets 5–30-flowered; glumes distichous, 2 lowest empty, several succeeding bisexual, perfecting nuts and deciduous seriatim from the lowest; rhachilla persistent. Stamens 3–1, anterior; anthers oblong, not crested. Style passing continuously into the ovary, not bulbous at the base; branches 2, linear, in a plane at right angles to the median plane of the spikelet, or in *J. pustulatus* branches sometimes 3. Nut oblong or ellipsoid, triangular, the anterior angle flattened, smooth.—*Cyperus*, Benth. et Hook. f. Gen. Pl. iii. 1043 partly.

Differs from *Cyperus* only in having the style 2-fid, not 3-fid.

Species 12, scattered through nearly all warm and temperate regions.

Spikes umbelled.
- Spikes numerous, cylindric, of very many spikelets . 1. *J. alopecuroides.*
- Spikes few, of 2–5 spikelets . . . . . 2. *J. pustulatus.*

Spikes congested into 1 dense compound head of many spikelets . . . . . 3. *J. pygmæus.*

Spike solitary, of 1–30 spikelets.
- Rootstock woody. Spikelets $\frac{1}{8}$ in. broad, straw-coloured . . . . . 4. *J. lævigatus.*
- Very small annual. Spikelets $\frac{1}{20}$ in. broad . . 5. *J. minutus.*

1. **J. alopecuroides,** *C. B. Clarke in Hook. f. Fl. Brit. Ind.* vi. 595. Large; flowering the first season. Stem solitary, 1½–3 ft. long, at the top trigonous and smooth. Leaves as long as the stem, ¼–⅓ in. broad. Umbel 6–24 in. in diam., compound; rays 4–10; bracts 3–8, lowest 6–15 by ¼–⅓ in. Spikes 3–5 together, sessile, 1–1½ by ⅓–½ in., dense, cylindric. Spikelets ¼–⅓ by $\frac{1}{12}$–⅛ in., compressed, 8–30-flowered, straw-coloured. Glumes very closely imbricated, ovate, concave, thin; rhachilla stout, subquadrangular, not winged. Nut ⅓ the length of the glume, obovoid, with the anterior angle flattened.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 543, and in Bull. Herb. Boiss. iv. Append. iii. 28; Urban, Symb. Antill. ii. 20. *Cyperus alopecuroides*, Rottb. Descr. et Ic. 38, t. 8, fig. 2; C. B. Clarke in Journ. Linn. Soc. xx. 283, and xxi. 30, 74, t. 2, fig. 12; Aschers. & Schweinf. Ill. Fl. Égypte, 156; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 49, 103. *C. semidives*, Steud. Syn. Pl. Glum. ii. 36.

Upper Guinea. Senegambia: Cape Verd, *Brunner*, 46! 64! Cape Verd Islands: St. Jago, *Hooker*, 100! Bornu, *Vogel!*

Nile Land. Kordofan, *Kotschy!* Abyssinia; Modat, *Schimper*, 110! 1478! and without precise locality, *Hildebrandt*, 361!

Lower Guinea. Angola: Benguela, *Menyharth*, 203! Mossamedes, *Hoepfner*, 1!

Mozamb. Dist. British Central Africa; Nyasaland, *Buchanan*, 417!

Also in North Africa, the Mascarene Islands, India, Malaya, Queensland and Guadeloupe.

Boeckeler has included this species under *Cyperus* (*Eucyperus*) *exaltatus*, Retz. It is therefore not possible to dissect the synonymy and geography satisfactorily in many cases. Schweinfurth's *Cyperus alopecuroides* is founded on his three numbers 920, 1487, 1716; of these 920, which I have seen, is *Cyperus exaltatus*, Retz; but it is very likely that the other two (or one of them) was *Pycreus alopecuroides*.

2. **J. pustulatus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 546. Annual. Stems tufted, 4–16 in. long, rather slender. Leaves few, ½–¾ the length of the stem, $\frac{1}{12}$–⅛ in. broad, weak. Umbel simple (sometimes 1 spike only present); rays 2–5, 0–2½ in. long; bracts 3, lowest 3–7 in. long, similar to the leaves. Spikes of 2–5 nearly sessile spikelets, ebracteolate. Spikelets up to ½ by nearly ⅕ in., turgid, moderately compressed, linear-oblong with parallel sides, 8–18-flowered, glistening-white purple-marked; rhachilla persistent, not winged. Glumes ovate, obtuse, 7-nerved, closely imbricated, rounded or scarcely keeled on the back, caducous regularly beginning with the lowest nut-bearing one. Style 2-fid or more rarely 3-fid. Nut ⅖ the length of the glume, obovoid, flattened on the anterior angle, usually so much flattened that the nut is biconvex and the anterior style-branch gone, sometimes unequal trigonous with 3 style-branches.—Rendle in Cat. Afr. Pl. Welw. ii. 109. *Cyperus pustulatus*, Vahl, Enum. ii. 341; Schumach. Beskr. Guin. Pl. 37; Kunth, Enum. ii. 63; Boeck. in Linnæa, xxxv. 491, and in Flora, 1879, 548; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 128 partly. *C. Barteri*, Boeck. in Linnæa, xxxv. 460; C. B. Clarke in Journ. Linn. Soc. xxi. 76.

Upper Guinea. Senegal: *Heudelot*, 313! Upper Senegal, *Lécard*, 224! Togo, *Kling*, 213! Niger Territory: Nupe, *Barter*, 1563! *Baikie!*

Nile Land. Soudan, *Lécard*, 133! British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2081! 1939 partly!

Lower Guinea. Angola: Pungo Andongo; marshes between the Præsidium and Quilanga, and on the banks of the River Casalale, *Welwitsch*, 6918! 7156!

South Central. Congo Free State: Lulua River, *Pogge*, 1569! 1584! by the Kasai River, *Duchesne*, 217!

This species has differentiated itself into *Juncellus*, but has not broken its connection with *Cyperus* entirely yet.

3. **J. pygmæus,** *C. B. Clarke in Hook. f. Fl. Brit. Ind.* vi. 596. Annual. Stems 1–10 in. long, usually in dense large tufts. Leaves often longer than the stem, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, flaccid, green. Inflorescence a dense compound head of very many (often 100) spikelets; bracts 3–8, dilated at the base, lowest up to 3–6 in. long, similar to the leaves. Spikelets $\frac{1}{5}$ by $\frac{1}{10}$ in., compressed, green to pale brown, 8–24-flowered; rhachilla persistent, often curved or twisted. Glumes close-packed; nut-bearing glumes distichous, boat-shaped, regularly deciduous beginning from the lowest. Style with 2 linear branches. Nut $\frac{1}{3}$–$\frac{1}{2}$ the length of the glume, ellipsoid, plano-convex, brown, smooth.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 546. *Cyperus pygmæus*, Rottb. Descr. et Ic. 20, t. 14, figs. 4–5; Kunth, Enum. ii. 18; Coss. & Durieu, Expl. Sc. Algér. Glum. 252; Schweinf. Pl. Nilot. 41, and Beitr. Fl. Aethiop. 215; Boeck. in Linnæa, xxxv. 493 (excl. var. β), and in Flora, 1879, 548; C. B. Clarke in Journ. Linn. Soc. xx. 282, and xxi. 28–30, 81, t. 2, figs. 10–10*a*, incl. var. β; Aschers. & Schweinf. Ill. Fl. Égypte, 156. *C. michelianus*, Delile, Fl. Ægypt. Illustr. 50. *Isolepis micheliana*, Benth. in Hook. Niger Fl. 553. *Dichostylis pygmæa*, Nees in Linnæa, ix. 289. *Pycreus pygmæus*, Nees in Linnæa, ix. 283.

Upper Guinea. Senegal, *Lelievre!* Galam, *Heudelot*, 387.

Nile Land. Near Khartoum, *Petherick!* Tutti Island, near Khartoum, *Kotschy*, 329! banks of the Nile between Old Dongola and Messaurat, *Bromfield!* at the 6th Cataract, *Schweinfurth*, 488! White Nile, *Schweinfurth*, 620! 852! Kordofan, *Pfund*, 482! 609! Sennar, *Hartmann*, 757!

Also in North Africa and the Orient, India, China, Amurland, Malaya, and Australia.

4. **J. lævigatus,** *C. B. Clarke in Hook. f. Fl. Brit. Ind.* vi. 596. Rhizome woody, creeping horizontally, long and with solitary distant stems or short and with crowded stems, their bases enclosed by imbricate shining chestnut-red scales. Stems 6–24 in. long, roundish, somewhat fleshy. Leaves usually short or scarcely any, sometimes exceeding the stem, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, the upper part terete-trigonous. Spikelets 1–30, in one apparently lateral head, straw-coloured; bracts 2, lower as though a continuation of the stem 1–3 in. long, similar to the leaves (when those are developed); spikelets $\frac{1}{3}$ by $\frac{1}{8}$ in., compressed, but thick, with parallel sides, 12–24-flowered. Glumes close-packed, broad-elliptic, obtuse, rounded on the back, the nut-bearing ones falling seriatim from the base of the persistent rhachilla. Style with 2 linear branches. Nut $\frac{1}{2}$–$\frac{2}{3}$ the length of the glume, obovoid, plano-convex,

the anterior angle rounded off, smooth, brown.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 544, in Bull. Herb. Boiss. iv. Append. iii. 28, and in Dyer, Fl. Cap. vii. 161; Durand & De Wild. in Comptes-rendus Soc. Bot. Belg. xxxvi. 88; Urban, Symb. Antill. ii. 21; Rendle in Cat. Afr. Pl. Welw. ii. 109. *Cyperus lævigatus*, Linn. Mant. 179, and in herb. propr.; Rottb. Descr. et Ic. 19, t. 16, fig. 1; Boeck. in Linnæa, xxxv. 486, and in Flora, 1879, 548; Oliver in Trans. Linn. Soc. xxix. 164; Coss. & Durieu, Expl. Scient. Algér. Glum. 250; C. B. Clarke in Journ. Linn. Soc. xx. 282, and xxi. 77, t. 3, figs. 20–21, t. 4, fig. 33; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 128; Aschers. & Schweinf. Ill. Fl. Égypte, 156; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 46; K. Schum. in Engl. Pfl. Ost-Afr. C. 118. *C. mucronatus*, Rottb. Descr. et Ic. 19, t. 8, fig. 4; Kunth, Enum. ii. 17; Barker Webb in Hook. Niger Fl. 182. *C. teretifolius*, A. Rich. Tent. Fl. Abyss. ii. 477. *C. subaphyllus*, Boeck. in Verhandl. Bot. Ver. Brandenb. xxx. 139. *C. submonostachyus*, Steud. et Jardin in Bull. Soc. Linn. Normand. sér. 2, ix. (1875) 272, 280. *Pycreus lævigatus*, Nees in Linnæa, x. 130. *P. mucronatus*, Nees in Linnæa, ix. 283.

Upper Guinea. Senegambia: banks of the River Senegal on the Island of St. Louis, *Brunner*, 18! Cape Verd Islands: St. Vincent, *Vogel*, 95! 99! 114! *Milne!* MacGillivray, 133! 1000 ft., *Welwitsch*, 7075! St. Antonio, *Vogel*, 64! *Ansell!* St. Nicholao, *Bolle!*

Nile Land. Nubia: Coast region, *Bent!* near Singot, *Schweinfurth*, iii. 139! Eritrea: Keren, 3800 ft., *Schweinfurth*, 777; Ailet, 1000 ft., *Schweinfurth*, 474! Abyssinia: Gursarfa, in marshy places, *Schimper*, 2160! and without precise locality, *Schimper*, 21! 1236! *Ehrenberg!* Somaliland: near Maid, *Hildebrandt*, 1474! British East Africa: Usongora, on the shore of the salt lake, *Scott-Elliot*, 7957! by the Kariandusi River, *Gregory*, 44!

Lower Guinea. Angola: Mossamedes; banks of the River Caraco, at Cabo Negro, *Welwitsch*, 6855! by the River Bero, near Cavalheiros, *Welwitsch*, 6856! near Os Cazados, *Welwitsch*, 6857! marshy ground near Aguadas, *Welwitsch*, 6858! German South-west Africa: Hereroland, *Fleck*, 161 partly!

Mozamb. Dist. German East Africa: Kilimanjaro, *Taylor!* Khutu: at the margin of a hot spring near Zungomero, *Speke & Grant!* British Central Africa: Nyasaland; Manganja Hills, *Meller!*

Found in all warm and temperate regions.

The variety *junciformis* (*C. junciformis*, Desfont. Fl. Atlant. i. 42, t. 7, fig. 1) with few, hard, black chestnut spikes, is spread over the warmer parts of the world, and common in North Africa, but no examples have been yet seen from Tropical Africa.

5. **J. minutus,** *C. B. Clarke in Journ. Bot.* 1896, 224. A very small annual. Stem 1–2 in. long. Leaves few, shorter than the stem, $\frac{1}{20}$ in. broad, weak. Head 1, of 8 spikelets; bracts 2, lower 1 in. long, similar to the leaves. Spikelets $\frac{1}{6}$ by $\frac{1}{25}$ in., compressed, straw-coloured red-tinged, 6–8-flowered. Glumes closely packed, boat-shaped, the green keel subexcurrent into a mucro. Stamens 2–1; anthers short-oblong, very small. Style long, slender, branches 2 much shorter than the style, or the style sometimes only minutely notched. Nut minute, pyriform, plano-convex, black, minutely punctate.

Nile Land. British East Africa: Ongalea Mountains; alt. 2750 ft., *Gregory*, 14!

This plant is very possibly rather a *Cyperus*. It is in the case of very small reduced species that generic characters elude us; *Cyperus tenellus* and *Schœnus nitens* have been treated as *Scirpus*.

4. CYPERUS, Linn.; Benth. et Hook. f. Gen. Pl. iii. 1043 (excluding the sections *Pycreus*, *Juncellus*, *Diclidium*, and *Mariscus*).

Spikes umbelled, or congested into a head, or solitary. Spikelets 5–70-flowered (in *C. ochrocephalus* 3–1-flowered); glumes distichous, 2 lowest empty, several succeeding bisexual, perfecting nuts and deciduous seriatim from the lowest; rhachilla persistent. Stamens 3–1, anterior; anthers oblong or linear, muticous or (rarely) crested, i.e. the connective produced. Style passing continuously into the ovary, not bulbous at the base; branches 3 (in *C. stoloniferus* occasionally 2), linear, or in a few species (*C. holostigma*, *C. nudicaulis*, *C. semitrifidus*, and others) branches short or hardly any. Nut oblong or obovoid, triquetrous, plane face against the rhachilla, anterior angle not (or occasionally somewhat) flattened.—Leaves all close to the base of the stem, sometimes none, i.e. basal sheaths only present. The spikelets are clustered or spicate in the spikes.

Species 300; in all warm and warm-temperate regions—a few extending to cool-temperate regions.

A. Pycnostachys.—Spikelets digitate or clustered or (rarely) subsolitary, i.e. not spicate. (Rhachilla wingless, or narrowly winged in *C. Hensii*.) Sect. 1–9.

§ i. ANOSPORUM.—Floating. Nut thickened by corky tissue at the base. Style long linear; branches 3, short. The African species leafless, with 1 head.

Stems rather slender, at the top $\frac{1}{25}$ in. in diam. .	1. *C. nudicaulis.*
Stems stout, at the top $\frac{1}{12}$–$\frac{1}{6}$ in. in diam., triquetrous	2. *C. Colymbetes.*

§ ii. MONOCEPHALÆ.—None annuals, except *C. Teneriffæ*. Stems with 1 head (2 heads once seen in *C. compactus*).—N.B. In the following sections, among the umbellate species, numerous examples with 1 head only occur. Also 49, *C. dichromenæformis* is constantly 1-headed.

Spikelets small, rarely so much as $\frac{1}{6}$ in. wide.	
Spikelets brown or chestnut-coloured.	
Style with 3 linear branches.	
Leaves narrow-linear, acute	4. *C. rupestris.*
Leaves narrow-linear, obtuse.	
Thickened base of stem oblong-cylindric .	5. *C. amnicola.*
Thickened base of stem globose, bulbous .	8. *C. atractocarpus.*
Style subentire or minutely 2–3-toothed at the tip	6. *C. holostigma.*
Spikelets yellowish, more or less tinged with red.	
Leaf-sheaths torn into pale fuscous fibres; spikelets $\frac{1}{16}$ in. wide	7. *C. Kirkii.*
Leaf-sheath torn into black fibres; spikelets $\frac{1}{10}$ in. wide	9. *C. clavinux.*
Spikelets white or cinnamon-coloured.	
Leaves and leaf-sheaths glabrous . . .	16. *C. leucocephalus.*

Leaf-sheaths (and often leaves) pubescent . 18. *C. somaliensis.*
Spikelets medium-sized, usually $\frac{1}{5}$-in. wide or more.
Glumes strongly mucronate or subaristate.
Stems tufted, thickened at the base . . . 3. *C. Teneriffæ.*
Stems on a horizontal stout rhizome, not thickened at the base . . . . 15. *C. pœcilus.*
Glumes obtuse, sometimes minutely apiculate.
(Spikelets white, straw-coloured, cinnamon-coloured or yellow.)
Basal sheaths not breaking up into fibres.
Rhizome very short or 0.
Spikelets 5–20 to a head, $\frac{1}{4}$ in. wide. . 11. *C. compactus.*
Spikelets 3–8 to a head, $\frac{1}{4}$–$\frac{1}{3}$ in. wide . 13. *C. margaritaceus.*
Rhizome very long, straight, rigid.
Spikelets 8–16-flowered . . . . 12. *C. angolensis.*
Spikelets 3–1-flowered . . . . 14. *C. ochrocephalus.*
Basal sheaths breaking up into fibres.
Head of 3–6 spikelets . . . . . 10. *C. niveoides.*
Head dense, of numerous spikelets . . 17. *C. zanzibarensis.*

§ iii. CONGLOMERATÆ.—None annuals. The dense heads few in a simple umbel, or agglomerated into 1 (sometimes very large) head. Spikelets straw-coloured to ferruginous-brown, or reddish in *C. Frerei.*

Roots woolly.
Glumes not very approximate; spikelet 8–16-flowered . . . . . 19. *C. conglomeratus.*
Glumes very approximate; spikelet often 20–40-flowered.
Stem rather slender, at the top more or less trigonous . . . . . 20. *C. cruentus.*
Stem thicker, terete, striate, at the top hardly trigonous . . . . . 21. *C. effusus.*
Roots not woolly.
Leaves coarse, tough; spikelets straw-colour to brown . . . . . 22. *C. maritimus.*
Leaves green, flat; spikelets tinged with red . 23. *C. Frerei.*

§ iv. GRACILES.—Slender, green annuals. Spikelets slender, green. Umbel loose. Nut verrucose, hardly cancellate . . . . 24. *C. cancellatus.*

§ v. UNCINATÆ.—Annuals. Spikelets small or medium-sized. Spikes umbelled. Glumes more or less mucronate.
Glumes minutely mucronate. Spikes golden-brown . 25. *C. amabilis.*
Glumes distinctly mucronate.
Mucro long recurved; glume strongly 3-nerved . 26. *C. uncinatus.*
Mucro shortly exserted; glume hardly 3-nerved . 27. *C. reduncus.*

§ vi. DIFFORMES.—Annuals or weak perennials. Spikes umbelled, usually very numerous. Glumes small, muticous or very nearly so.
Spikelets numerous in each spike.
Stems annual, tufted.
Spikelets dusky or brownish . . . . 28. *C. difformis.*
Spikelets whitish-green, glistening . . . 29. *C. microlepis.*
Stems subsolitary, on a long rhizome . . . 30. *C. dichroostachyus.*

Spikelets 1–5 in each spike.
Spikelets lanceolate, chestnut to black . . . 31. *C. phæorhizus.*
Spikelets parallel-sided, yellowish-green or reddish.
Bracts usually shorter than the umbel . . 32. *C. Haspan.*
Bracts longer than the umbel . . . . 33. *C. flavidus.*

§ vii. PULCHRÆ.—Leafy. Rhizome woody. Spikes umbelled. Glumes rigid, shining.

Style long; branches much shorter than the undivided part . . . . . 38. *C. apricus.*
Style short; branches much longer than the undivided part.
Spikes 2–1; leaves green, weak . . . . 39. *C. Adansoni.*
Spikes numerous; leaves narrow, tough.
Style (including its branches) hardly longer than the nut.
Nut much flattened on the anterior angle . 34. *C. podocarpus.*
Nut subequally trigonous . . . . 36. *C. Hensii.*
Style branches much longer than the minute nut.
Rhizome hardly any.
Spikelets $\frac{1}{5}$–$\frac{3}{5}$ in. long; glumes closely packed 35. *C. tenax.*
Spikelets 1 in. long; glumes rather loosely packed . . . . . 37. *C. Boehmii.*
Rhizome 2 in. long, horizontal, woody, nodose 40. *C. sphærospermus.*

§ viii. TEXTILES.—Leafless. Rhizome woody. Umbel with numerous spikes.

Primary rays of umbel subequal, often very numerous.
Bracts numerous, much longer than the umbel, rather broad.
Stems terete, or under the umbel scarcely trigonous.
Primary rays of umbel rather thick . . 41. *C. flabelliformis.*
Primary rays of umbel very slender . . 42. *C. alternifolius.*
Stems 6-angular under the umbel . . . 43. *C. sexangularis.*
Bracts much shorter than the umbel.
Stems terete . . . . . 47. *C. prolifer.*
Stems triquetrous . . . . . 48. *C. isocladus.*
Primary rays of umbel unequal, rarely more than 15; bracts not very conspicuous.
Stem acutely triquetrous under the umbel.
Spikelets pale to reddish-brown; glumes yellow on the keel . . . . . 44. *C. denudatus.*
Spikelets shining black; glumes 1-coloured . 45. *C. lucentinigricans.*
Stem under the umbel round or obscurely trigonous . . . . . 46. *C. marginatus.*

§ ix. DIFFUSÆ.—None annual. Leaves green, usually long, flat, 3-nerved, grassy, not rolled up in the dried state.

Umbel congested into 1 head; spikelets pallid
Glumes remote, hardly imbricated in fruit . . 49. *C. dichromenæformis.*
Glumes close-packed, even in ripe fruit . . 50. *C. mapanioides.*
Umbel simple, with very long flexuose rays . . 51. *C. fertilis.*
Umbel compound with numerous spikes; depauperated examples rarely occur.

Bracts much longer than the umbel, 3-nerved.
Spikelets linear-oblong or linear; with (usually) more than 6 nuts.
Spikelets in fruit green; nut nearly as long as the glume . . . . . 57. *C. diffusus.*
Spikelets in fruit reddish or brownish (8 species very closely allied).
Spikelets $\frac{1}{12}$–$\frac{1}{8}$ in. wide.
Glumes closely packed, hardly mucronate.
Nut ovoid.
Spikelets compressed; glumes rather rigid . . . . . 52. *C. Mannii.*
Spikelets turgid; glumes soft . 54. *C. fischerianus.*
Nut oblong . . . . . 53. *C. Deckenii.*
Glumes in fruit hardly overlapping, with a small mucro.
Bracts $\frac{1}{3}$ in. wide . . . . 55. *C. derreilema.*
Bracts $\frac{3}{4}$–1 in. wide . . . . 56. *C. Ajax.*
Spikelets $\frac{1}{16}$–$\frac{1}{12}$ in. wide.
Spikelets short-oblong; umbel rigid . 59. *C. Baroni.*
Spikelets linear-oblong; umbel flexuose.
Leaves $\frac{1}{4}$ in. broad . . . . 58. *C. glaucophyllus.*
Leaves $\frac{1}{2}$–$\frac{3}{4}$ in. broad . . . 60. *C. zambesiensis.*
Spikelets short oblong, with (usually) 3–4 nuts . 61. *C. Renschii.*
Bracts not (or scarcely) overtopping the umbel, 1-nerved . . . . . 62. *C. aureobruneus.*

B. **Choristachys.**—Spikelets spicate.

a. SUBEXALATÆ.—Rhachilla not or scarcely winged. Leaves and bracts long, except in 72, *C. socialis.*

§ x. COMPRESSÆ.—Annuals; but sometimes persisting and flowering the second year.

Nut nearly as long as the glume . . . . 63. *C. Iria.*
Nut $\frac{1}{3}$–$\frac{2}{5}$ the length of the glume.
Glumes obtuse, scarcely apiculate.
Spikelets $\frac{1}{16}$–$\frac{1}{12}$ in. broad . . . . 64. *C. sphacelatus.*
Spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. broad . . . . 66. *C. incompressus.*
Glumes acute, mucronate or aristate.
Spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. broad . . . . 65. *C. compressus.*
Spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. broad . . . . 67. *C. aristatus.*

§ xi. Not annuals. Elongate stolons produced by most species.
Leaves 0 . . . . . 72. *C. socialis.*
Leaves long.
Rhachis of the spikes minutely hairy . . 73. *C. pilosus.*
Rhachis of the spikes glabrous.
Glumes with an excurrent mucro . . 70. *C. eleusinoides.*
Glumes muticous or scarcely apiculate.
Glumes in fruit overlapping . . . 71. *C. latifolius.*
Glumes in fruit overlapping but little.
Spikelets in fruit aicular, divaricate . 68. *C. distans.*
Spikelets in fruit linear, suberect . 69. *C. nutans.*

xii. Stems approximate on a nodose woody rhizome. Spikelets hard with rigid glumes . . . . . 74. *C. pratensis.*

b. ALATÆ.—Rhachilla obviously winged. Each marginal base of the glume is decurrent on the rhachilla; the glume falls off, leaving this ovate or lanceolate marginal base on the rhachilla—the "wings of the rhachilla"—which themselves are persistent or late deciduous or very early caducous, and are scarious, white, yellow, brown or pinkish.

§ xiii. TUNICATÆ.—Leafy. Stolons exceedingly slender, disappearing after the bulbs are formed on them. Bulbs clothed (tunicate) when ripe by a tough black coat; flower-stem of the second year, springing from a bulb.

Bulbs more than $\frac{1}{3}$ in. in diam.; umbel condensed into a dense head of 30 spikelets . . . . 77. *C. grandibulbosus.*

Bulbs less than $\frac{1}{3}$ in. in diam.

Inflorescence of 6 spikelets in one spike, nowise umbelled . . . . . 78. *C. blysmoides.*

Inflorescence of 2–4 subumbelled spikes, or of one head.

Head 1, dusky brown-red, of many spikelets . 79. *C. Stuhlmanni.*

Spikes 2–4, laxly spicate, imperfectly umbelled.

Bulbs $\frac{1}{4}$ in. in diam., coat tough, striated . 75. *C. bulbosus.*

Bulbs $\frac{1}{4}$ in. in diam., coat scarious shining brown . . . . . 76. *C. usitatus.*

Bulbs $\frac{1}{10}$ in. in diam.; plant very slender . 80. *C. microbolbos.*

Inflorescence a fully developped umbel, usually compound.

Stem much swollen at the base; leaves with whip-like ends . . . . . 81. *C. callistus.*

Stem scarcely swollen at the base.

Leaves shining; spikelets very bright shining red . . . . . 82. *C. fulgens.*

Spikelets not shining; bulbs zonate . . 83. *C. esculentus.*

§ xiv. BREVIFOLIATÆ.—Leaves very short or 0.

Leaves and bracts hardly any; stem (when dry) pseudo-septate . . . . . 84. *C. articulatus.*

Leaves and bracts short; stem not (or obscurely) septate . . . . . 85. *C. corymbosus.*

§ xv. REMOTIGLUMÆ.—Leafy. Glumes rather farther apart (remote) on the rhachilla, by which alone this section differs from the *Rotundæ*. Stolons hardening into woody rhizomes, sometimes very short, and not seen on many examples. Large or medium-sized plants. In several species, the wings of the rhachilla are very narrow.

Spikelets chestnut or bright brown.

Leaves short; stem at the top acutely triquetrous . 86. *C. schimperianus.*

Leaves long.

Umbel compound, open; stem 2–3 ft. long . 87. *C. aterrimus.*

Umbel contracted almost to a head; stem 6–9 in. long . . . . . 88. *C. atroviridis.*

Spikelets a black lurid-green . . . . . 89. *C. maranguensis.*

Spikelets a bright ferruginous-red . . . . 90. *C. nubicus.*

Spikelets straw-coloured, or (in *C. schweinfurthianus*, var.) yellow.

Stem very scabrous at the top . . . . 92. *C. schweinfurthianus.*

Stem smooth at the top.

Stem rather slender; spikelets spreading . . 91. *C. Zollingeri.*

Stem rather stout; spikelets suberect . . 93. *C. elatior.*

§ xvi. ROTUNDÆ.—Leafy. Glumes approximate. Large or medium-sized plants, producing stolons or lateral shoots near the base. Wings of the rhachilla conspicuous.

Spikelets scarcely attaining $\frac{1}{12}$ in. in breadth, exactly linear, i.e. of the same width, nearly their whole length with parallel sides.
- Stem at the base oblong-thickened by leaf-sheaths — 108. *C. ibeensis.*
- Stem at the base not oblong-thickened.
  - Spikelets up to $1\frac{1}{2}$ in. long, 60-flowered, straw-coloured — 95. *C. locuples.*
  - Spikelets 1 in. long, ashy-brown — 98. *C. congensis.*
  - Spikelets less than 1 in. long.
    - Spikelets highly coloured; glumes brown with green keel — 102. *C. nuerensis.*
    - Spikelets pallid; rhizome $\frac{1}{4}$ in. thick, woody — 99. *C. Heudelotii.*
    - Spikelets pallid, usually dull red spotted — 97. *C. maculatus.*

Spikelets $\frac{1}{12}$ in. broad, usually broader, linear, more or less lanceolate.
- Spikelets very pale straw-coloured, sometimes red-tinged.
  - Spikelets very slightly compressed, rigid — 96. *C. natalensis.*
  - Spikelets distinctly compressed, loose — 105. *C. fenzelianus.*
- Spikelets chestnut or chestnut-red.
  - Spikes congested so that the umbel appears simple — 103. *C. rigidifolius.*
  - Spikes loose; umbel manifestly compound — 100. *C. rotundus*, var.

Spikelets ferruginous-reddish; glumes with yellow or yellow-brown keel.

Spikelets large, $\frac{1}{10}$ in. broad, in one dense compound head — 104. *C. Taylori.*

Spikelets either less than $\frac{1}{10}$ in. broad, or in a large open umbel.
- Anthers with an elongate triangular crest on the connective — 106. *C. fissus.*
- Anthers not crested; tip of connective very short, triangular.
  - Nut $\frac{3}{5}$—$\frac{3}{4}$ the length of the glume, oblong — 94. *C. gracilinux.*
  - Nut less than $\frac{3}{5}$ the length of the glume.
    - Stem at the base decumbent, hardly bulbous — 101. *C. longus.*
    - Stem at the base suberect, bulbous thickened.
      - Rays of umbel either long stout or short — 100. *C. rotundus.*
      - Rays of umbel long slender — 107. *C. tuberosus.*

§ xvii. EXALTATÆ.—Leaves and bracts long. Tall annuals without stolons, sometimes producing in autumn short lateral shoots, and flowering a second season. Umbel large, compound. Rhachilla of spikelets conspicuously winged. Style (with its 3 branches) small. Nut small.

Spikelets linear, much compressed. Wings of the rhachilla persistent, except in *C. immensus.*
- Wings of rhachilla falcate, yellow, early deciduous — 112. *C. immensus.*
- Wings of rhachilla narrowly oblong, hyaline, persistent.

Spikelets hard; margins of the glumes not incurved.
Spikes all sessile . . . . . 109. *C. radiatus.*
Spikes (some of them) pedunculed . . . 110. *C. exaltatus.*
Spikelets loose; margins of the glumes incurved . . . . . 111. *C. Pethericki.*
Spikelets narrow-linear, nearly terete. Wings of rhachilla yellow, early deciduous.
Stem at the top moderately trigonous; umbel very large.
Umbel rays $\frac{1}{20}$–$\frac{1}{16}$ in. in thickness . . . 113. *C. digitatus.*
Umbel rays $\frac{1}{5}$–$\frac{1}{6}$ in. in thickness . . . 114. *C. grandis.*
Stem at the top acutely triquetrous; umbel not very large . . . . . 115. *C. auricomus.*

§ xviii. PAPYRÆ.—Tall. Flowering stem leafless. Umbel large with innumerable rays. Plant 8–16 ft. high . . . . . 116. *C. Papyrus.*

1. **C. nudicaulis,** *Poir. in Lam. Encycl.* vii. 240. Glabrous, floating. Rhizome long, $\frac{1}{8}$ in. in diam. Stems tufted, 1–2$\frac{1}{2}$ ft. long, at the top $\frac{1}{25}$ in. in diam., round trigonous. Leaves 0; leaf-sheaths pale-brown or reddish, the uppermost produced on one side 0–$\frac{1}{2}$ in. but hardly green. Head 1, of 1–12 sessile spikelets; bracts 1–3, lowest often suberect, shorter than the head, as though a continuation of the stem. Spikelets $\frac{1}{2}$–1 by $\frac{1}{6}$–$\frac{1}{5}$ in. (rarely up to $\frac{1}{4}$ in. broad), much flattened, 30–40-flowered, sometimes 70-flowered, pallid or reddish. Glumes very closely packed, ovate, boat-shaped, apiculate, 3–5-nerved, sometimes scabrous on the upper part of the keel, falling seriatim from the lowest fertile glume; rhachilla persistent. Stamens 3; filaments broad; anther-cells thick, muticous. Style long, linear; branches 3, linear, very short. Nut $\frac{2}{3}$ the length of glume, ovoid, flattened, long acuminate; base of the nut, especially the margins, corky thickened.—Kunth, Enum. ii. 48; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 133, and in Journ. Bot. 1884, 16, in Obs.; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 570; K. Schum. in Engl. Pfl. Ost-Afr. C. 118; Urban, Symb. Antill. ii. 23; Rendle in Cat. Afr. Pl. Welw. ii. 112; cfr. Benth. et Hook. f. Gen. Pl. iii. 1044. *C. pectinatus,* Vahl, Enum. ii. 298; Kunth, Enum. ii. 107. *Atomostylis cyperiformis,* and *A. flavescens,* Steud. Syn. Pl. Glum. ii. 315. *Anosporum nudicaule,* Boeck. in Linnæa, xxxvi. 411, and in Flora, 1879, 561.

Upper Guinea. Senegambia: Ndanout, *Dollinger,* 41! Cameroons: Yaunde, *Zenker & Staudt,* 332! Cape Verd, *Perrottet!* Niger Territory: Nupe; on the margins of lakes, *Barter,* 1568!

Nile Land. White Nile, *Schweinfurth,* 1117! Gazelle River, *Schweinfurth,* 1146! 1157!

Lower Guinea. Congo Free State: Kisantu on the Inkissi River, *Gillet,* 1248! 1558! and without precise locality, *Dewèvre,* 253! Angola: Dande; by the Dande River, *Welwitsch,* 7028!

Mozamb. Dist. German East Africa: Karagwe; Bakoba, *Stuhlmann,* 1163! and without precise locality, *Fischer,* 638! British Central Africa: Nyasaland; marshes near the River Shire, *Kirk!*

Also in Madagascar and Martinique.

2. **C. Colymbetes,** *Kotschy et Peyr. Pl. Tinn.* 49, *t.* 24. Glabrous, floating. Stems tufted on an oblique rhizome, 1–2 ft. long, at the top $\frac{1}{12}$–$\frac{1}{6}$ in. in diam., triquetrous. Leaves 0. Head 1, of 6–30 sessile spikelets; bracts 2, lowest shorter than the head. Spikelets $\frac{1}{2}$–$\frac{2}{3}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., much flattened, often 40-flowered, pallid or reddish, otherwise as *C. nudicaulis*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 551; K. Schum. in Engl. Pfl. Ost-Afr. C. 118. *Anosporum Colymbetes*, Boeck. in Linnæa, xxxvi. 412, and in Flora, 1879, 561; Schweinf. Beitr. Fl. Aethiop. 295. *A. macrostachyum*, Boeck. in Linnæa, xxxvi. 413.

Nile Land. Floating on the White Nile near the mouth of the Bahr el Gebel, *Schweinfurth*, 1125! and near the Bahr el Ghazal, *Brownell! Werne!*

Mozamb. Dist. German East Africa: without precise locality, *Fischer*, 637! Portuguese East Africa: Lower Zambesi; Expedition Island, *Kirk!*

Also in Madagascar.

This species is exceedingly close to *C. nudicaulis*, Poiret, and best recognised by the much thicker stem. The spikelets are usually broader and the glumes longer; but in a Senegambian example (referred above to *C. nudicaulis*), the spikelets are as broad as in the average *C. Colymbetes*.

3. **C. Teneriffæ,** *Poir. in Lam. Encycl.* vii. 245. Glabrous. Stems 2–9 in. long, the broad reddish sheaths forming an oblong swelling at the base, tufted. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{8}$ in. broad. Head 1, of 3–20 sessile spikelets; bracts 2, the lower 1–2 in. long, similar to the leaves. Spikelets $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{5}$–$\frac{1}{4}$ in., much compressed, red, 10–36-flowered. Glumes closely imbricated, narrowly boat-shaped, strongly 4-ribbed on each side, conspicuously mucronate. Style about as long as the nut; branches 3, linear, rather shorter. Nut less than $\frac{1}{2}$ the length of the glume, ellipsoid or subovoid, with concave faces.—Nees in Linnæa, x. 131; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 601, in Durand & Schinz, Conspect. Fl. Afr. v. 579, and in Dyer, Fl. Cap. vii. 166; K. Schum. in Engl. Pfl. Ost-Afr. C. 118. *C. rubicundus*, Kunth, Enum. ii. 49; Boeck. in Linnæa, xxxv. 507; Schweinf. Beitr. Fl. Aethiop. 216, and in Bull. Herb. Boiss. ii. Append. ii. 46, 102; C. B. Clarke in Journ. Linn. Soc. xxi. 104; Engl. Hochgebirgsfl. Trop. Afr. 139; not of Vahl. *C. Serra*, A. Rich. Tent. Fl. Abyss. ii. 479.

Nile Land. Eritrea: below Geleb, 5200 ft., *Schweinfurth & Riva*, 1256! Abyssinia: rocky places near Goelleb, 3500 ft., *Schimper*, 2340! and without precise locality, *Schimper*, 603! Somaliland: *Mrs. Lort-Phillips. Keller*, 90! 95! 97! British East Africa: Uganda, *Lugard!* Lake Elmeteita, *Gregory*, 6574! Gilgit River, 6000–7000 ft., *Scott-Elliot*, 6574! Taita; Ndara Mountains, *Gregory*, 9! Ukamba, *Hildebrandt*, 2658! Tsimba (Shimba) Mountains, *Taylor!*

Mozamb. Dist. Zanzibar, *Taylor!* German East Africa: Kilimanjaro; Lake Chala, 2500 ft., *Volkens*, 322! Karagwe; Bukoba, *Stuhlmann*, 1099!

Also in Teneriffe, South Africa, Arabia, Madagascar and India.

4. **C. rupestris,** *Kunth, Enum.* ii. 52. Glabrous. Stems 2–8 in. long, slender, thickened at the base by fibrillose leaf-sheaths, tufted.

Leaves often as long as the stem, $\frac{1}{16}$ in. broad. Head 1, of 2–10 sessile spikelets; bracts 2–3, lowest up to 3 in. long, similar to the leaves. Spikelets chestnut-red, $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{8}$ in., much compressed, shining, hard, 8–18-flowered, sides parallel. Glumes closely imbricated, ovate, striate, nearly one-coloured; mucro minute, subrecurved. Style about $\frac{1}{2}$ the length of the nut; branches 3, very long. Nut $\frac{1}{2}$ the length of the glume, ellipsoid, triquetrous, obtuse.—C. B. Clarke in Dyer, Fl. Cap. vii. 167.

Mozamb. Dist. British Central Africa: Nyasaland; Zomba Plateau, 2500–3000 ft., *Whyte!*

Also in South Africa.

5. **C. amnicola,** *Kunth, Enum.* ii. 52. Leaves very narrow, margins when dry inrolled, tip obtuse. Bracts similar to the leaves; tips obtuse. Glumes muticous. Otherwise as *C. rupestris.*—Boeck. in Linnæa, xxxv. 509; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 131; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 548, and in Dyer, Fl. Cap. vii. 167.

Lower Guinea. Angola: Huilla; in dried-up swamps near Nene, *Welwitsch,* 6878 (ex *Ridley*).

Also in South Africa.

6. **C. holostigma,** *Schweinf. in Bull. Herb. Boiss.* ii. *Append.* ii. 103. Glabrous. Rhizome very short. Stems thickened at the base, clustered, 2–4 in. long, very slender. Leaves a little shorter than the stem, almost setaceous. Head 1, of 3–6 subdigitate spikelets; bracts 2–3, lowest up to 1 in. long, setaceous, spreading. Spikelets $\frac{1}{4}$ by $\frac{1}{12}$ in., narrow lanceolate, black, 10–15-flowered. Glumes 9–11-nerved, muticous. Style long exserted, the tip subentire or very shortly 2–3-lobed.

Nile Land. Eritrea: Plateau of Kohaito, 8500 ft., *Schweinfurth,* 120!

Schweinfurth detected this curious species, made a drawing of the style and sent it to me. It may possibly be a mountain reduced chestnut-black state of *C. apricus,* Ridley (n. 38 below).

7. **C. Kirkii,** *C. B. Clarke.* Glabrous. Stems 4–5 in. long, slender, at the base thickened and woody, in a tough tuft; basal sheaths persistent in dirty straw-coloured fibres. Leaves overtopping the stems, setaceous. Head 1, of 5–12 subdigitate spikelets; bracts 3, lowest $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, similar to the leaves. Spikelets $\frac{2}{5}$ by $\frac{1}{16}$ in., compressed, dense, 14–18-flowered, yellowish or reddish, with parallel sides. Glumes closely imbricated, 5–7-nerved, minutely apiculate, scarcely mucronate. Style short, linear; branches 3, long. Nut not seen.

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; Lupata, *Kirk!* British Central Africa: Nyasaland; Manganja Hills, *Meller!*

8. **C. atractocarpus,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 141. Glabrous. Stems 4–8 in. long, rather slender, thickened and sub-bulbous at the base, united on a very short horizontal rhizome. Leaves $\frac{1}{2}$ the length of the stem, very narrow, suddenly contracted

from broad many-striated bright-brown sheaths with scarious margins. Head 1, of 4–1 sessile spikelets; bracts hardly as long as the head. Spikelets 1 by $\frac{1}{8}$ in., bright-brown, 16–20-flowered. Glumes 9–11-nerved, hardly acute. Style slender, short; branches 3, very long. Nut nearly $\frac{1}{2}$ the length of the glume, trigonous, linear-oblong (not seen ripe).—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 549; Engl. Hochgebirgsfl. Trop. Afr. 139; Rendle in Cat. Afr. Pl. Welw. ii. 118.

Lower Guinea. Angola: Huilla; on the higher pastures of Empalanca, 5000 ft., *Welwitsch*, 6863 !

This is very close to *C. amnicola*, Kunth; the stems are more bulbous at the base and the nut narrower.

9. **C. clavinux,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 551. Glabrous. Stems $1\frac{1}{2}$–3 in. long, at the base woody and covered by black fibres (fragments of leaf-sheaths). Leaves overtopping the stems, $\frac{1}{12}$ in. broad. Head 1, of 8-20 nearly sessile spikelets; bracts 3–2, lowest up to 3 in. long, suberect, similar to the leaves. Spikelets $\frac{1}{3}$ by $\frac{1}{10}$ in., compressed, 20-flowered, pallid, with parallel sides. Glumes boat-shaped, thin, ovate, hardly acute; nerves 5, close to the keel, often red-spotted, sides nerveless and colourless. Style short; branches 3, long. Nut hardly half the length of the glume, trigonous-globose, suddenly contracted almost into a stalk, black-brown, glistening with dots (i.e. the superficial quadrangular cells becoming scarious, finally porose).

Upper Guinea. Bornu, *Vogel*, 64 ! 65 !

10. **C. niveoides,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 570. Glabrous. Stems 4–8 in. long, tufted, at the base much thickened by tough torn dusky straw-coloured sheaths. Leaves $\frac{2}{3}$ the length of the stem, setaceous (less than $\frac{1}{20}$ in. broad). Head 1, of 3–6 spikelets; bracts 2–3, lowest up to 2 in. long, setaceous, spreading. Spikelets $\frac{2}{5}$ by $\frac{1}{5}$ in., flattened, elliptic, 12-flowered, whitish. Glumes very closely imbricate, muticous, acutely keeled; sides hardly striated. Young ovary trigonous.

South Central. Lunda: Mukenge, *Pogge*, 1576 ! 1608 !

This came to hand marked *Cyp. macropus* (i.e. *Mariscus macropus* below), to which the base of the stems and heads bear a very general resemblance. The examples are young, but hardly differ from the Indian *C. niveus*, Retz.

11. **C. compactus,** *Lam. Ill.* i. 144, *not of Retz.* Glabrous. Stems 4–16 in. long, robust or medium, thickened at the base by hard black-brown (not fibrillose) leaf-sheaths, contiguous, fused into a short horizontal rhizome. Leaves as long as the stem, or sometimes much shorter, $\frac{1}{10}$–$\frac{1}{5}$ in. broad. Head 1, of 5–20 spikelets, $\frac{1}{2}$–$1\frac{1}{2}$ in. in diam., dirty straw-coloured or yellowish (but see var. *flavissima*); bracts 3–4, lowest 2–4 in. long, similar to the leaves, spreading, dilated at the base. Spikelets $\frac{1}{3}$–$\frac{2}{3}$ by $\frac{1}{5}$–$\frac{1}{4}$ in., broad oblong or ovoid, compressed, 8–18-flowered. Glumes $\frac{1}{5}$–$\frac{1}{3}$ in. long, very closely packed, elliptic-oblong,

muticous, with many conspicuous striations. Nut $\frac{1}{3}$ the length of the glume (yet rather large for *Cyperus*), triquetrous, obovoid, smooth, black; style shorter than the nut, branches 3, linear.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 552, and in Dyer, Fl. Cap. vii. 168; K. Schum. in Engl. Pfl. Ost-Afr. C. 118; Durand & Schinz, Études Fl. Congo, i. 284; Rendle in Cat. Afr. Pl. Welw. ii. 112. *C. obtusiflorus*, Vahl, Enum. ii. 308; Kunth, Enum. ii. 45; Boeck. in Linnæa, xxxv. 528, and in Abhandl. naturw. Ver. Bremen, vii. (1880) 36; C. B. Clarke in Journ. Linn. Soc. xx. 286, and xxi. 110; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 132; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 47, 102. *C. ambongensis*, Boeck. in Linnæa, xxxviii. 361. *C. argenteus*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 133. *C. niveus*, var. *polyphyllus*, Boeck. in Flora, 1879, 550.

Upper Guinea. Niger River, *Baikie!*

Nile Land. Eritrea: Geleb, 6300 ft., *Schweinfurth*, 1212; Ginda, 4000 ft., *Schweinfurth*, 131, 415; Mount Alamkale, 6000 ft., *Schweinfurth*, 1639. Somaliland: Darra-As, *Miss Edith Cole! Mrs. Lort-Phillips!* Serrut Mountains near Maid, 5200 ft., *Hildebrandt*, 1477. British East Africa: Jur; Abu Guroon's Seriba, *Schweinfurth*, iii. 187! Albert Nyanza, *Stuhlmann*, 2873! Malewa, *Gregory*, 42! Victoria Nyanza, *Scott-Elliot*, 6477! Nandi, *Scott-Elliot*, 6894! Rabai Hills, near Mombasa, *Taylor!* Mombasa, *Wakefield!*

Lower Guinea. Lower Congo, *Smith*, 63! Angola: Pungo Andongo; hills between Candumba and Muta Lucala, 3500 ft., *Welwitsch*, 6900! Huilla, 5000 ft.; near the Catumba rivulet, *Welwitsch*, 6905! near Nene, *Welwitsch*, 6906!

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1064! *Linck*, 117! *Schmidt*, 67! German East Africa: Mafia Island, *Bartle Frere!* Usambara; Tanga, *Volkens*, 151! Meru Mountain, 2400 ft., *Volkens*, 1644! Usaramo; Kagehi, *Fischer*, 631! and without precise locality, *Stuhlmann*, 900! 3434! British Central Africa: Urungu; Fwambo, 5200 ft., *Nutt!* Nyasaland; Namasi, near Zomba, *Cameron*, 94! and without precise locality, *Buchanan*, 23! 393! Matabeleland, *Elliott!*.

Abundant also in South Africa and the Mascarene Islands.

This abundant species varies much in size, also in the breadth of the spikelets; the young spikelets are much less compressed and look different from the ripe ones. It is possible to subdivide perhaps the material here collected; but it must be noted (1) that the variety and species which follow are very near *C. compactus*, (2) that none of the material should be referred (as by Boeckeler and others) to the Indian *C. niveus*, Retz., which has much thinner glumes, and can be definitely distinguished, though nearly allied.

Var. *flavissimus*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 552. Spikelets golden-yellow, or yellowish or brown.—C. B. Clarke in Dyer, Fl. Cap. vii. 168; Rendle in Cat. Afr. Pl. Welw. ii. 112. *C. obtusiflorus*, var. *flavissimus*, Boeck. in Linnæa, xxxv. 529; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 132. *C. flavissimus*, Schrad. Anal. Fl. Cap. 5, t. 2, fig. 2. *C. sphærocephalus*, Vahl, Enum. ii. 310; Kunth, Enum. ii. 45; T. Thoms. in Speke, Nile, Append. 654; Oliver in Trans. Linn. Soc. xxix. 164, t. 108, fig. A; K. Schum. in Engl. Pfl. Ost-Afr. C. 118.

Lower Guinea. Angola: Huilla; in the drier pastures near Lopollo, 5000 ft., *Welwitsch*, 6876!

Mozamb. Dist. German East Africa: Jiwa-la-Mkoa, in the Mgunda Mkhali, 4488 ft., *Speke & Grant!*

Abundant in South Africa.

I concur with Boeckeler in thinking there is no difference in structure between

this and *C. compactus* type. The colour sometimes, as in Grant's example, is golden-yellow; but there is a complete series from this into straw-colour and into brown.

Var. *tenerior*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 552. Much slenderer with smaller spikelets and nuts.—Rendle in Cat. Afr. Pl. Welw. ii. 112.

Upper Guinea. River Niger, *Baikie!*

Lower Guinea. Angola: Huilla; in the pastures of Empalanca, 6000 ft., *Welwitsch*, 6803!

This variety was founded on Welwitsch, 6803; Baikie's (which has no rhizome) may prove to be different. There may be 1 (or 2) new species latent here.

12. **C. angolensis,** *Boeck. in Flora*, 1880, 435. Rhizome oblique, 4 by $\frac{1}{8}$–$\frac{1}{6}$ in., clothed by stout ovate acute striate pale brown scales $\frac{1}{2}$–$\frac{2}{3}$ in. long. Stem solitary on the rhizome, 4–12 in. long. Leaves often as long as the stem, $\frac{1}{6}$ in. broad. Bracts and head as of *C. compactus*, Lam. —Durand & Schinz, Études Fl. Congo, i. 283. *C. ochrocephalus*, C. B. Clarke in Trans. Linn. Soc. ser. 2, Bot. iv. 53; Rendle in Cat. Afr. Pl. Welw. ii. 112; not *Ryncospora ochrocephala*, Boeck.

Lower Guinea. Lower Congo: Kimuenza, *Gillet*, 1740! Angola: Huilla; on dry hills near Lake Ivantala, 5000 ft., *Welwitsch*, 6838! Golungo Alto; Sobato de Bumba, *Welwitsch*, 6813! marshy banks of the River Quiapoze, *Welwitsch*, 7014! Malange, *Mechow*, 182!

South Central. Congo Free State; Zenze, *Laurent!* Mukenge, *Pogge*, 1604! 1605! Mpala, *Descamps*, 10! Wba Kionde, *Dupuis!* Mission Caba, *Zilmann*, 14! and without precise locality, *Dewèvre*, 275!

Mozamb. Dist. British Central Africa: Nyasaland; Mount Mlanji, *Whyte!* Mount Zomba, 3000–6000 ft., *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!*

I cannot distinguish this species from *C. compactus* unless I have the rhizome. The spikelets are many-flowered; and my naming it (l.c.) in 1894 *C. ochrocephalus* (which species has 3–2-flowered spikelets) was an error. The style is always 3-fid with me.

13. **C. margaritaceus,** *Vahl, Enum.* ii. 307. Glabrous. Stems 6–24 in. long, thickened at the base by leaf-sheaths, contiguous, rhizome very short or 0. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{10}$–$\frac{1}{6}$ in. broad. Head 1, of 3–6 spikelets; bracts 3, lowest up to 2–4 in. long, similar to the leaves. Spikelets up to $\frac{3}{4}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., much flattened, white, straw-coloured or pale brown, 20-flowered. Glumes up to $\frac{1}{4}$ in. long, very close-packed, muticous, with numerous strong striations. Nut $\frac{1}{3}$–$\frac{2}{5}$ the length of the glume, ellipsoid, triquetrous with concave faces.—Schumach. & Thonn. Beskr. Guin. Pl. 33; Kunth, Enum. ii. 46; Benth. in Hook. Niger Fl. 550; Jardin, Herbor. 13; Boeck. in Linnæa, xxxv. 529; C. B. Clarke in Journ. Linn. Soc. xxi. 110, in Durand & Schinz, Conspect. Fl. Afr. v. 568, in Bull. Herb. Boiss. iv. Append. iii. 30, and in Dyer, Fl. Cap. vii. 169; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 133; Ficalho et Hiern in Trans. Linn. Soc. ser. 2, Bot. ii. 26; K. Schum. in Engl. Pfl. Ost-Afr. C. 119; Durand & Schinz, Études Fl. Congo, i. 290; Rendle in Cat. Afr. Pl. Welw. ii. 112. *C. eburneus*, Thonning ex Kunth, Enum. ii. 46.

Upper Guinea. Gambia, *Mackenzie-Skues !* Niger Territory: Quorra (Niger) River, *Vogel*, 19! Nupe, *Barter*, 620! Gold Coast: Accra, *Don*, 7! *Ansell! Vogel!*

Lower Guinea. Lower Congo: Maladi, 150–300 ft., *Hens*, A, 210! Gaboon: *Jardin!* Congo Free State: Kisantu on the Inkissi River, *Gillet*, 1289! Angola Pungo Andongo; Condo Quisonde, 3500 ft., *Welwitsch*, 6903! Huilla, near Humpata, 6000 ft., *Welwitsch*, 6904! *Newton*, 14! German South-west Africa: Dammaraland, *Een!*

South Central. Congo Free State: Lusambo, *Duchesne*, 18! 29!

Mozamb. Dist. Zanzibar, *Stuhlmann*, 94! *Taylor!* British Central Africa: Urungu; Fwambo, *Carson*, 20!

Also in South Africa, where this type form is rare.

I have described above the Upper Guinea plant, the type of Vahl, and distinct enough from *C. compactus*, Lam., by the broad flattened spikelets, few to a head.

Var. *pseudonivea*, C. B. Clarke. Spikelets 3–13 to the head, $\frac{2}{3}$ by $\frac{1}{6}$–$\frac{1}{5}$ in., somewhat compressed, but turgid.—*C. pseudoniveus*, Boeck. in Verhandl. Bot. Ver. Brandenb. xxix. 45.

Lower Guinea. German South-west Africa: Amboland; Olukonda, *Schinz*, 376! Dammaraland, *Een!*

Mozamb. Dist. British Central Africa: Urungu; Fwambo, *Carson*, 67! Nyasaland; Manganja Hills, *Meller!* and without precise locality, *Buchanan*, 1424! 1425! 1451! Rhodesia: Zambesi Valley; Boruma, *Menyharth*, 1172! Leshumo Valley, *Holub!*

Frequent in South Africa.

The type of Boeckeler's *Cyp. pseudoniveus* is Schinz, 376, which Buchanan, 1424! 1425! matches. Several of the numbers cited for this variety were formerly referred to *C. compactus*, Lam., and I see no good line between this var. *pseudonivea* and *C. compactus*.

14. **C. ochrocephalus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 571, *not of Steud.* Glabrous. Rhizome seen 9 in. long by $\frac{1}{6}$–$\frac{1}{5}$ in. in diam., several arising from one point, cylindric, perfectly straight, rigid, spreading on the ground, and rooting beneath nearly their whole length, covered above by shining scales $\frac{1}{3}$–$\frac{1}{2}$ in. long. Stem 1 from the end of each rhizome, 4–12 in. long. Leaves 4 by $\frac{1}{6}$ in. Head 1, $\frac{1}{3}$–$\frac{1}{2}$ in. in diam., of 50 spikelets, yellow; bracts 3, the lowest $1\frac{1}{2}$ in. long, similar to the leaves, dilated at the base. Spikelets (young) $\frac{1}{5}$–$\frac{1}{4}$ in. long, 3–1-flowered; lowest flower 2-sexual, second flower male. Glumes elliptic-oblong, much inrolled, smooth. Style-branches 3, long, linear.—K. Schum. in Engl. Pfl. Ost-Afr. C. 122; Durand & Schinz, Études Fl. Congo, i. 291. *C. obtusiflorus*, var. stylo 2-fido, Ridley (errore) in Trans. Linn. Soc. ser. 2, Bot. ii. 132. *Rynchospora ochrocephala*, Boeck. in Flora, 1879, 568; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 164.

South Central. Lunda: Kimbundu, *Pogge*, 412!

This extraordinary species K. Schumann proposes now (l.c.) to arrange in *Mariscus*, probably because of the few flowers to the spikelet. I have seen no ripe spikelets and leave it here for the present; the rhizome is exceedingly like that of *Cyp. angolensis*.

15. **C. pœcilus,** *C. B. Clarke.* Glabrous. Rhizome short, horizontal, thick, clothed by brown scales. Stem 8 in. long, rather slender. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{12}$–$\frac{1}{10}$ in. broad. Head 1, of 12–20 spikelets; bracts 3–4, lowest up to 3 in. long, similar to the leaves (i.e. very narrow). Spikelets $\frac{1}{2}$ by $\frac{1}{5}$ in., slightly compressed, 16–20-flowered, green variegated with purple. Glumes oblong, very closely packed, rounded on the back, the excurrent mucro long, almost a bristle; ribs numerous, strong. Style shorter than the nut; branches 3, long, brown-red, much exserted. Nut $\frac{1}{4}$ the length of the glume (mucro included), oblong-ellipsoid.

Nile Land. Somaliland: Mandira, *Keller*, 88!

Named many-coloured (pœcilus) on account of the green-straw spikelets being spotted with purple, and almost comose from the red exserted styles.

16. **C. leucocephalus,** *Retz. Obs.* v. 11. Glabrous. Stems 4–10 in. long, slender, bulbous at the base, tufted. Leaves $\frac{1}{3}$–$\frac{2}{3}$ the length of the stem, $\frac{1}{16}$–$\frac{1}{12}$ in. broad. Head 1, globose, pallid or cinnamon-coloured, $\frac{1}{3}$–$\frac{2}{3}$ in. in diam., of 6–40 spikelets; bracts 3, lowest 2 in. long, similar to the leaves. Spikelets attaining $\frac{1}{3}$ by $\frac{1}{6}$ in., but more often about half these dimensions, much compressed. Glumes broad-oblong, obtuse, 3–1-nerved; closely placed, but in the dry state usually not imbricated owing to the inrolling of the margins. Stamen (at least very often) 1. Style much shorter than the nut; branches 3, linear, medium short. Nut $\frac{1}{3}$–$\frac{2}{3}$ the length of the glume, oblong, round-trigonous, yellow, somewhat glistening.—Kunth, Enum. ii. 97; Boeck. in Linnæa, xxxv. 590; C. B. Clarke in Journ. Linn. Soc. xxi. 107, in Hook. f. Fl. Brit. Ind. vi. 602, and in Durand & Schinz, Conspect. Fl. Afr. v. 566; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 137; Engl. Hochgebirgsfl. Trop. Afr. 141; Rendle in Cat. Afr. Pl. Welw. ii. 115. *C. seslerioides*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 130, not of H. B. & K. *C. Sorostachys*, Boeck. in Linnæa, xxxv. 588. *Sorostachys kyllingioides*, Steud. Syn. Pl. Glum. ii. 71.

Upper Guinea. Senegal, *Leprieur!* Soudan, *Lécard*, 110!

Lower Guinea. Angola: Huilla; banks of the River Cacolovar, 5000 ft., *Welwitsch*, 1675! in spongy mountainous places at Humpata, *Welwitsch*, 6783! Pungo Andongo; 3500 ft., *Welwitsch*, between the Præsidium and Quilanga, *Welwitsch*, 6772! pastures of the Præsidium near Quilanga and Catete, *Welwitsch*, 7146! 7147!

Also in India, Malaya, Australia and Tropical America.

This plant varies a good deal in the size of the spikelets, but has not been much confused with any other *Cyperus*. It has been arranged, in the best herbaria, freely with *Kyllingia*, *Ascolepis*, and *Lipocarpha*.

17. **C. zanzibarensis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 581. Glabrous. Stems 10 in. long, medium stout, bulbous at the base with torn black leaf-sheaths, tufted. Leaves $\frac{1}{3}$–$\frac{2}{3}$ the length of the stem, narrow. Head 1, $\frac{2}{3}$ by $\frac{1}{2}$ in., dense, white, of very numerous spikelets; bracts 3–4, lowest 2–3 in. long, similar to the leaves. Spikelets $\frac{1}{3}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., linear-oblong, compressed, 6–10-

flowered. Glumes closely imbricated, oblong, obtuse, many-nerved. Stamens 3. Style as long as the nut; branches 3, linear, much exserted. Nut $\frac{1}{2}$ the length of the glume, oblong, brown.—*C. sansibarensis*, K. Schum. in Engl. Pfl. Ost-Afr. C. 121.

Nile Land. British East Africa: Mombasa, *Taylor!*

Dr. K. Schumann may be correct, from his great linguistic knowledge, in altering the spelling to Sansibar. I would gladly accept the correction if it would obviate our Indices being afflicted for all time with two words (instead of one), but Dr. Schumann's alteration of a first letter has made me helpless.

18. **C. somaliensis,** *C. B. Clarke in Kew Bulletin*, 1895, 229. Stems 4–6 in. long, slender, at the base cylindric-thickened by leaf-sheaths, tufted, hard, with wiry roots. Leaves $\frac{1}{2}$–$\frac{3}{4}$ the length of the stems, setaceous, glabrous or pubescent; sheaths always pubescent. Head 1, $\frac{1}{3}$–$\frac{1}{2}$ in. in diam., of 6–24 spikelets, straw- or cinnamon-coloured; bracts 2, lowest up to 2 in. long, setaceous. Spikelets up to $\frac{1}{5}$ by $\frac{1}{6}$ in. (mostly smaller), ovoid, flattened, 4–8-flowered. Glumes boat-shaped, obtuse, many-striate. Style as long as the nut; branches 3, linear, exserted. Nut $\frac{2}{5}$ the length of the glume, triquetrous, obovoid, brown, curved, asymmetric.

Nile Land. Somaliland, *Mrs. Lort-Phillips! Miss Edith Cole!*

This plant appears most like *C. niveus*, Retz., but is on a very much smaller scale. The heads, though dense, are evidently compound, which approximates it to the succeeding section.

19. **C. conglomeratus,** *Rottb. Descr. et Ic.* 21, *t.* 15, *fig.* 7. Glabrous. Rhizome usually hardly any, sometimes elongate; roots woolly. Stems 4–24 in. long, round-trigonous towards the top. Leaves sometimes twice as long as the stem, sometimes only half as long, $\frac{1}{10}$–$\frac{1}{5}$ in. broad, very stout and tough, midrib very obscure, margins much inrolled when dry. Spikes few in a simple umbel, or very often condensed into 1 head; bracts 3–5, lowest suberect, dilated at the base, often 3–6 in. long, similar to the leaves. Spikelets 3–25 to a head, $\frac{1}{2}$–$\frac{1}{3}$ by $\frac{1}{6}$–$\frac{1}{4}$ in., 8–16-flowered, moderately compressed, straw-coloured or pale brown. Glumes tightly imbricated but not placed very close together on the rhachilla, ovate with a minute mucro, rounded on the back, many-ribbed, somewhat shining, especially on the margins. Style short; branches 3, linear, rather long. Nut as long as $\frac{1}{3}$ the glume, obovoid, unequally trigonous.—Boiss. Fl. Orient. v. 369, var. and mainly; Aschers. & Schweinf. Ill. Fl. Égypte, 156; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 602, and in Durand & Schinz, Conspect. Fl. Afr. v. 554. *C. jeminicus*, Rottb. Descr. et Ic. 25, t. 8, fig. 1; Kunth, Enum. ii. 24, not of Retz. *C. pungens*, Boeck. in Linnæa, xxxv. 537 (excl. var. *elatus*); C. B. Clarke in Journ. Linn. Soc. xxi. 113. *C. arcuatus*, Boeck. in Linnæa, xxxv. 542. *C. proteinolepis*, Boeck. in Linnæa, xxxv. 542.

Upper Guinea. Senegal, *Roger*, 69!

Nile Land. Nubian Desert: Wady el Derood, *Petherick!* Galabat: Matamma, *Oudney*, 4! 5! Darfur, *Purdy*, 42!

Also in the Mediterranean Region, Arabia, Beloochistan and Sind.

Var. *Aucheri*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 554. Very bright. Spikelets larger, shining, up to 2 by $\frac{1}{4}$ in. with 46 flowers; rhachilla broad.—*C. Aucherii*, Jaub. & Spach, Ill. Fl. Orient. t. 101; C. B. Clarke in Journ. Linn. Soc. xxi. 114.

North Central. On sand-hills near Agadem Oasis, *Vogel !*

Also in Egypt.

This is a very striking plant; the glumes in the ripe spikelet are $\frac{1}{16}$ in. apart on the rhachilla; so that, if it is not admitted as a species, it must be appended to *C. conglomeratus*, and not to *C. effusus*, i.e. according to the diagnosis of these two critical species given here.

20. **C. cruentus,** *Rottb. Descr. et Ic.* 21, *t.* 5, *figs.* 1, 4. Stems at the top trigonous. Spikelets narrower and glumes less distant on the rhachilla, but otherwise as *C. conglomeratus*.—Kunth, Enum. ii. 82; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 555. *C. falcatus*, Boeck. in Linnæa, xxxv. 546, and in Flora, 1879, 550; Schweinf. Beitr. Fl. Aethiop. 215, and in Bull. Herb. Boiss. ii. Append. ii. 47; Zarb, Cat. Spéc. Bot. Pfund, 39. *C. proteinolepis*, Steud. Syn. Pl. Glum. ii. 15 partly; Boeck. in Linnæa, xxxv. 522 partly (at least Kotschy, n. 21, cited). *C. curvulus*, Boeck. in Linnæa, xxxv. 541 partly. *C. conglomeratus*, T. Anders. in Journ. Linn. Soc. v. Suppl. i. 38; C. B. Clarke in Journ. Linn. Soc. xxi. 112, var. *a*; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 47. *C. pungens*, var. *multiculmis*, Boeck. in Linnæa, xxxv. 538.

Nile Land. Nubia: Dongola, *Ehrenberg !* Abu-Gerad, *Kotschy*, 21 ! O-bak, *Schweinfurth*, 645 ! Kordofan, *Pfund*, 245 ! 466 ! Fogel, *Pfund*, 610 (ex *Zarb*). Eritrea: near Massowa, *Steudner*, 912 ! *Schweinfurth & Riva*, 66 ! 208 !

Also Egypt, Arabia and Beloochistan.

Var. *excisus*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 555. Glumes more mucronate, their tips slightly spreading in fruit.—*C. excisus*, Boeck. in Linnæa, xxxv. 523.

Upper Guinea. Senegambia, *Heudelot*, 517 ! Senegal, *Perrottet !*

In this variety, as in most of *C. cruentus* type, the spikelets as they ripen get very brown; in *C. conglomeratus* they usually remain pallid. In a given length of rhachilla there are nearly twice as many nuts in *C. cruentus* as there are in *C. conglomeratus*.

21. **C. effusus,** *Rottb. Descr. et Ic.* 22, *t.* 12, *fig.* 3. Stem rather stouter, striate, terete, hardly at all trigonous even at the top. Spikelets nearly as those of *C. cruentus*, i.e. narrower with less distant glumes than the spikelets of *C. conglomeratus*, otherwise as the two last species. —Kunth, Enum. ii. 47; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 603, and in Durand & Schinz, Conspect. Fl. Afr. v. 559. *C. proteinolepis*, Steud. Syn. Pl. Glum. ii. 15 partly; Boeck. in Linnæa, xxxv. 522 mainly; C. B. Clarke in Journ. Linn. Soc. xxi. 113. *C. acutiflorus*, Steud. Syn. Pl. Glum. ii. 33. *C. conglomeratus*, var. *a*, Coss. & Durieu, Expl. Scient. Algér. Glum. 243. *C. conglomeratus*, var. *effusus*, Boiss. Fl. Orient. v. 369. *C. conglomeratus*, var. *major*, Boeck. in Linnæa, xxxv. 544 partly; C. B. Clarke in Journ. Linn. Soc. xxi. 112.

C. curvulus, Boeck. in Linnæa, xxxv. 541 partly. *C. densus* and *C. involutus*, R. Br. in Salt, Abyss. Append. 63 (names only).

Nile Land. Hanish (Harnish) Island, in the Red Sea, *Slade!* Eritrea: near Massowa, *Steudner*, 9162, *Schweinfurth & Riva*, 208! Abyssinia, *Salt!*

Also in Egypt, Syria, Arabia, Socotra and Sind.

The spikelets in this species are usually 20–40-flowered (the glumes standing much closer than in *C. conglomeratus*), and sometimes they are (though narrow) more than 1½ in. long with 60 flowers. It should be understood that this series (our species 19–21) are considered but one species by Boissier and by Cosson (botanists who generally took a narrow view of species); while Boeckeler has described them as 6 or 7 species. The variability of the series is great, and a middle course has been taken here of collecting the forms under the 3 old types of Rottboell. But as Boeckeler has grounded his species largely on the size of the specimens, the curvature of the stems, &c. (esteemed as of small import here), the synonymy has become both complex and imperfect.

22. **C. maritimus,** *Poir. in Lam. Encycl.* vii. 240. Glabrous. Stolons up to 12 in. long, ⅛ in. in diam., terete; nodes 1 in. apart, scales 1 in. long, elliptic-oblong; roots not woolly. Stems 4–16 in. long, stout, trigonous, smooth, often approximate. Leaves often as long as the stem, ⅕–¼ in. broad, coarse, tough, hardly scabrous. Umbel much contracted, usually 1 compound head, when young pallid or cinnamon-coloured, when ripe deep brown; bracts 3–6, lowest 4–8 in. long, similar to the leaves. Spikelets often 10–20 to a spike (3 or 5 spikes agglomerated or nearly so), ½ by ⅙ in., 8–14-flowered, slightly compressed. Glumes ovate, obtuse, hardly apiculate, round on the back, many-nerved. Nut ⅓ the length of the glume, obovoid, shining black.—Kunth, Enum. ii. 47; Boeck. in Peters, Reise Mossamb. Bot. 539, and in Linnæa, xxxv. 539; C. B. Clarke in Journ. Linn. Soc. xx. 285, and in Durand & Schinz, Conspect. Fl. Afr. v. 569; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 135; K. Schum. in Engl. Pfl. Ost-Afr. C. 119; Durand & Schinz, Études Fl. Congo, i. 290; Rendle in Cat. Afr. Pl. Welw. ii. 113. *C. rigidus*, Vahl, Enum. ii. 309. *C. heterophyllus*, Boeck. in Flora, 1859, 441.

Upper Guinea. Gold Coast, *Krause*, 103!

Lower Guinea. Congo, *Smith! Daniell!* Angola: Ambriz; near Ponta d'Ambriz, *Welwitsch*, 7039! Loanda; in dry sandy and gravelly soil, *Welwitsch*, 7044! 7050!

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1068! *Kuntze*, 204! German East Africa: Usaramo; Bagamoya, *Hildebrandt*, 1068B! Rovuma River, *Meller!* Rovuma Bay, *Kirk!* Portuguese East Africa: Raza Island, *Forbes*, 42! Beira, *Kuntze*, 302! Quilimane, *Berlin Herb.!* Zambesi Delta; Kongone River, *Kirk!*

Also in Madagascar.

The spikelets flowers and nuts in this species are exceedingly like those of large examples of *C. conglomeratus*.

Var. *crassipes*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 569. Stems very stout, tufted on a short thick oblique rhizome. Umbel contracted into 1 dense compound head 2 in. (sometimes more) in diam., with 60–100 spikelets. —Durand & Schinz, Études Fl. Congo, i. 291; Rendle in Cat. Afr. Pl. Welw. ii. 114.

C. crassipes, Vahl, Enum. ii. 299; Beauv. Fl. Owar. ii. 63, t. 97, fig. 1; Kunth, Enum. ii. 82; Boeck. in Linnæa, xxxv. 539. *C. scirpoides*, Vahl, Enum. ii. 311; Schumach. Beskr. Guin. Pl. 34; Kunth, Enum. ii. 107. *C. Jardini*, Steud. in Jardin, Herbor. 7, and Syn. Pl. Glum. ii. 28. *C. cephalostachyus*, Steud. Syn. Pl. Glum. ii. 315 (from Africa, not America, as Steudel states).

Upper Guinea. Senegal, *Roger!* Senegambia: Mbidjem, *Thierry*, 86! and without precise locality, *Heudelot*, 478! Cape Verd Islands, *Cunningham! Bolle! Lowe!* Sierra Leone, *Smeathman! Afzelius!* Lagos, *Millen*, 160! Owaire, *Beauvois!*

Lower Guinea. Congo, *Smith!* Loango, *Jardin!*

23. **C. Frerei,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 563. Glabrous. Rhizome creeping, $\frac{1}{6}$–$\frac{1}{3}$ in. in diam.; nodes very short; roots not woolly. Stems 12–16 in. long, subsolitary, at the top trigonous and smooth. Leaves $\frac{1}{2}$–$\frac{2}{3}$ the length of the stem, narrow, green, flat. Umbel (with rays hardly $\frac{1}{3}$ in. long) contracted nearly into a dense head 1–2 in. in diam.; bracts 3–4, the lowest $4\frac{1}{2}$ in. long, similar to the leaves. Spikelets up to 1 by $\frac{1}{4}$ in., compressed, reddish, 30–40-flowered. Glumes closely packed, elliptic, hardly mucronate, 13-ribbed. Style as long as the nut; branches 3, linear, long, much exserted. Nut $\frac{2}{5}$ the length of the glume, obovoid, triquetrous, shining black.—K. Schum. in Engl. Pfl. Ost-Afr. C. 121.

Nile Land. British East Africa: Frere Town and Rabai Hills, near Mombasa, *Taylor!*

24. **C. cancellatus,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 131. A slender, glabrous, green annual. Stems 4–8 in. long, tufted. Leaves as long as the stem, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, sometimes smaller. Umbel compound, loose; rays up to 3–$4\frac{1}{2}$ in. long; bracts as long as the rays, similar to the leaves. Spikelets 1–4 together, digitate, green, red-spotted, linear, $\frac{2}{5}$ by $\frac{1}{16}$ in., with parallel sides, compressed, 6–24-flowered. Glumes close-packed, ovate, hardly nerved; keel green, ended by a broad triangular point. Style-branches 3, hardly exserted. Nut minute, obovoid, trigonous, white, verrucose, almost tubercular (scarcely cancellate). C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. C. 551; K. Schum. in Engl. Pfl. Ost-Afr. C. 118; Rendle in Cat. Afr. Pl. Welw. ii. 110.

Nile Land. British East Africa: Rabai Hills, near Mombasa, *Taylor!*

Lower Guinea. Angola: Pungo Andongo; between Muta Lucala and Lombe, and banks and streams near Cabonda in the Præsidium, *Welwitsch*, 6916! rice-fields near Caghuy, *Welwitsch*, 6917! Huilla; spongy grounds in the woods of Monino, 5000 ft., *Welwitsch*, 6862!

25. **C. amabilis,** *Vahl, Enum.* ii. 318. Glabrous, slender, annual. Stems 2–8 in. long, tufted. Leaves $\frac{1}{3}$–$\frac{1}{2}$ the length of the stem, $\frac{1}{12}$ in. broad, weak. Umbel compound or simple, rarely reduced to 1 head; rays sometimes 14, up to 4 in. long; bracts up to 2–4 in. long, usually shorter than the umbel, similar to the leaves. Spikelets 3–10 together, subdigitate, golden-brown, $\frac{2}{3}$ by $\frac{1}{16}$–$\frac{1}{12}$ in., compressed, 16–36-flowered. Glumes ovate, boat-shaped, obtuse, the mucro very minutely or

obsoletely excurrent; sides golden, not striated; keel of 3–5 green nerves. Style nearly as long as the nut; branches 3, linear, hardly exserted. Nut $\frac{2}{5}$ the length of the glume, obovoid, smooth, brown.—Schumach. Beskr. Guin. Pl. 35; Kunth, Enum. ii. 108; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 130; C. B. Clarke in Journ. Linn. Soc. xx. 283, xxi. 85, in Hook. f. Fl. Brit. Ind. vi. 598, in Durand & Schinz, Conspect. Fl. Afr. v. 547, and in Bull. Herb. Boiss. iv. Append. iii. 29; Durand & Schinz, Études Fl. Congo, i. 283; Urban, Symb. Antill. ii. 24; Rendle in Cat. Afr. Pl. Welw. ii. 109. *C. microstachyos*, Vahl, Enum. ii. 318; Schumach. Beskr. Guin. Pl. 36; Kunth, Enum. ii. 108. *C. aureus*, H. B. & K. Nov. Gen. et Sp. i. 205; Kunth, Enum. ii. 21; Boeck. in Linnæa, xxxv. 494, in Peters, Reise Mossamb. Bot. 535, and in Flora, 1879, 548; Ficalho & Hiern in Trans. Linn. Soc. ser. 2, Bot. ii. 26. *C. aurantiacus*, H. B. & K. Nov. Gen. et Sp. i. 205; Kunth, Enum. ii. 20; Benth. in Hook. Niger Fl. 549. *C. lepidus*, Hochst. ex Steud. Syn. Pl. Glum. ii. 14. *C. triqueter*, Boeck. in Flora, 1879, 548, in Engl. Jahrb. v. 90, and in Engl. Gazelle Reise, Bot. 14.

Upper Guinea. Gambia, *Mungo Park!* Niger Territory: Lower Niger; Patteh Mountain, *Vogel*, 193! Nupe, *Baikie!*

Nile Land. Kordofan: Arashkol Mountain, *Kotschy*, 139! British East Africa: Ador village, in Kitch district, *Petherick!* Bongo; near Addai, *Schweinfurth*, 2183! Jur; Jur Ghattas, *Schweinfurth*, 2256! ser. iii. 193! near Mombasa, *Taylor!* by the River Sabaki, *Gregory*, 116!

Lower Guinea. Lower Congo: Stanley Pool, *Hens*, B, 61! Angola: Barra do Bengo, near Quifandongo, *Welwitsch*, 7084! Loando, 1000 ft., *Welwitsch*, 7024! 7083! Benguella; in sandy woods, *Welwitsch*, 6892! Pungo Andongo; in sandy woods near the River Cuanza, 3500 ft., *Welwitsch*, 6912! Huilla; between Lopollo and Monino, 5000 ft., *Welwitsch*, 6893!

South Central. Lunda; River Lulua, *Pogge*, 465! Bangala, *Hens*, 135!

Mozamb. Dist. Zanzibar, *Taylor! Schmidt*, 62! *Decken*, 115! German East Africa: Usambara; Amboni, *Holst*, 2598! Rovuma River, *Kirk!* Mwanza, on Lake Victoria, *Stuhlmann*, 4531! Portuguese East Africa: Mozambique, *Kuntze*, 205! *Peters!* Inhambane, *Scott!* British Central Africa: Nyasaland; Mount Zomba, 5000–6000 ft., *Whyte!* Zomba Rock, *Whyte!* Shire Highlands, *Buchanan*, 18! and without precise locality, *Buchanan*, 624B! Likoma Island in Lake Nyasa, *Johnson*, 47! Boruma, on the Zambesi, *Menyharth*, 555 partly! Upper Zambesi, *Pinto*, 69 (ex *Hiern*).

Also in South Africa, Madagascar, India and Trop. America.

Var. ? *macra*, C. B. Clarke. Much larger in all parts. Stems up to 18 in. long. stout. Umbel simple; rays short, erect; bracts several, long, dilated at the base, Spikelets (young) $\frac{1}{2}$–$\frac{3}{5}$ in. long, erect in close clusters.—*C. amabilis*, var. *macer*, Durand & Schinz, Conspect. Fl. Afr. v. 547, by typogr. error.

Lower Guinea. Congo, *Smith*, 26!

26. **C. uncinatus,** *Poir. in Lam. Encycl.* vii. 247. Glabrous, annual. Stems 2–10 in. long, tufted, slender. Leaves usually as long as the stem, setaceous. Umbel simple (rarely compound or reduced to a head); bracts 3–6, much overtopping the umbel, setaceous. Spikelets digitate, often 3–10 together, $\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., compressed, 8–28-flowered, from pale ferruginous to brown. Glumes ovate, strongly 3-nerved, the green

keel excurrent in a recurved prominent bristle. Nut as long as ½ the glume (exclusive of the mucro), oblong-obovoid.—Kunth, Enum. ii. 21; Boeck. in Linnæa, xxxv. 502; C. B. Clarke in Journ. Linn. Soc. xx. 284, xxi. 90, and in Durand & Schinz, Conspect. Fl. Afr. v. 580; Dur. et De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 89; K. Schum. in Engl. Pfl. Ost-Afr. C. 118; Durand & Schinz, Études Fl. Congo, i. 294; Urban, Symb. Antill. ii. 24; Rendle in Cat. Afr. Pl. Welw. ii. 110. *C. capitatus*, Retz. Obs. iv. 9 (?); Kunth, Enum. ii. 97, not of Vandelli. *C. cuspidatus*, H. B. & K. Nov. Gen. et Sp. i. 204; Kunth, Enum. ii. 22; Boeck. in Linnæa, xxxv. 496; Oliver in Trans. Linn. Soc. xxix. 164; C. B. Clarke in Journ. Linn. Soc. xx. 284, xxi. 88, and in Hook. f. Fl. Brit. Ind. vi. 598; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 130. *C. squarrosus*, T. Thoms. in Speke, Nile, Append. 653, not of Linn. *Dichostylis cuspidata*, Palla in Engl. Jahrb. x. 296.

Upper Guinea. Sierra Leone, *Smeathman!* Niger Territory: Nupe, *Barter*, 1569!

Nile Land. British East Africa: Jur, *Schweinfurth*, 1984 partly! Madi; on rocky heights, *Speke & Grant!* Soudan, *Lécard*, 140!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 342! Lower Congo; Msuata, *Buettner*, 12! Kinchassa, on Stanley Pool, *Duchesne*, 176! Stanley Pool, *Hens*, B, 68! Kisantu, *Gillet*, 502! Lutete, *Hens*, A, 23! Lufu, 200–500 ft., *Hens*, A, 207! Angola: Pungo Andongo, 3500 ft., *Welwitsch*, 6910! 7155! 7157! 7168! Golungo Alto; near Cambondo, *Welwitsch*, 7099! Huilla; in damp places in *Sorghum* fields, 5000 ft., *Welwitsch*, 6879! Humpata, *Newton*, 24!

Mozamb. Dist. British Central Africa: Nyasaland; Namasi, *Cameron*, 13!

Common in all tropical and warm temperate lands.

C. aristatus, Rottb., having similar recurved points to the glumes, has been much confused with the present species, but differs *inter alia* by having the spikelets spicate, not digitate.

27. **C. reduncus,** *Boeck. in Linnæa*, xxxv. 580. Glabrous, annual, or (in *Heudelot*, 172) furnished with a rhizome 1 by $\frac{1}{16}$ in. Stems 2–10 in. long, tufted. Leaves as long as the stem, $\frac{1}{8}$ in. broad. Umbel usually compound, 3–4 in. in diam., sometimes reduced; bracts overtopping the umbel, similar to the leaves. Spikes digitate, of 3–20-spikelets, straw-coloured or brownish. Spikelets $\frac{1}{2}$–$\frac{2}{3}$ by $\frac{1}{6}$–$\frac{1}{5}$ in., much flattened, 30-flowered. Glumes boat-shaped, obscurely 3-nerved; keel green, excurrent into a short recurved mucro. Style short; branches 3, linear, short. Nut $\frac{2}{3}$–$\frac{3}{4}$ the length of the glume, narrow-oblong, brown.—Oliver in Trans. Linn. Soc. xxix. 165; Hochst ex Boeck. in Flora, 1879, 550; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 573; K. Schum. in Engl. Pfl. Ost-Afr. C. 119. *C. aristatus*, T. Thoms. in Speke, Nile, Append. 653 partly, not of Rottb.

Upper Guinea. Senegambia, *Heudelot*, 172! 286! Niger Territory: Nupe, *Barter*, 903! Ogurude, on the Cross River, *Holland*, 257!

Nile Land. Upper Sennar: Fazokl, *Figari!* British East Africa: Jur; Jur Ghttas, *Schweinfurth*, 2433! Unyoro, in marshes, *Speke & Grant!*

South Central. Lunda: by the River Lulua, *Pogge*, 464!

28. **C. difformis,** *Linn. Amœn. Acad.* iv. 302. Annual, glabrous, slender or medium-sized. Stems 4–20 in. long, tufted, at the top triquetrous. Leaves $\frac{1}{2}$–$\frac{2}{3}$ the length of the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Spikes in a simple or compound umbel, or contracted into 1 head; bracts 2–4, lowest 2–10 in. long, similar to the leaves. Spikelets many in dense heads, dusky or brown, $\frac{1}{5}$–$\frac{2}{5}$ by $\frac{1}{25}$–$\frac{1}{24}$ in., compressed but somewhat turgid, 10–30-flowered. Glumes close-packed, concave, very obtuse, tip usually scarious. Stamen 1, rarely 2; anther small, oblong, hardly exserted. Style much shorter than the nut; branches 3, linear, short. Nut nearly as long as the glume, trigonous, ellipsoid, very little narrowed at the base, smooth, straw-coloured, finally brown.—Sp. Pl. ed. ii. 67; Kunth, Enum. ii. 38; Benth. in Hook. Niger Fl. 550; Boeck. in Linnæa, xxxv. 586, and in Flora, 1879, 550; Oliver in Trans. Linn. Soc. xxix. 165; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 599, in Durand & Schinz, Conspect. Fl. Afr. v. 556, in Bull. Herb. Boiss. iv. Append. iii. 29, and in Dyer, Fl. Cap. vii. 170; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 137; K. Schum. in Engl. Pfl. Ost-Afr. C. 120; Durand & Schinz, Études Fl. Congo, i. 285; Rendle in Cat. Afr. Pl. Welw. ii. 115. *C. protractus*, Roem. & Schultes, Syst. Veg. ii. Mant. 102; Zarb, Cat. Spéc. Bot. Pfund, 39.

Upper Guinea. Senegambia, *Heudelot*, 213! 326! Senegal, *Leprieur!* Sierra Leone: Falaba, *Scott-Elliot*, 5158! Niger; *Baikie!* Cameroons: Yaunde, *Zenker*, 1513!

Nile Land. Darfur: Er Rahad, *Pfund*, 614 (ex *Zarb*). British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2473! Niamniam, *Schweinfurth*, 3066! Upper Nile; Madi, *Speke & Grant!* Albert Nyanza, 2500 ft., *Stuhlmann*, 2872! Ukamba, *Gregory*, 103! Rabai Hills, near Mombasa, *Taylor!*

Lower Guinea. Island of St. Thomas, *Don!* Lower Congo: Kisantu, *Gillet*, 367! 989! 1398! among the rocks of Ntamo, near Stanley Pool, *Hens*, B, 5! 6! and without precise locality, *Smith*, 13! Angola: Barra do Dande; banks of a lake near Bombo, *Welwitsch*, 7027! Mossamedes; on the banks of the River Bero, 1000 ft., *Welwitsch*, 6853! 6883! Loanda; near Forte de Conceiçao, very rare, 1000 ft., *Welwitsch*, 7065! Ambaca; by Lake Canguele-Canganga, and banks of the River Caringa, *Welwitsch*, 7066! Golungo Alto; on the islands of the river near Banza de Bango, very rare, *Welwitsch*, 7067! Pungo Andongo; between Condo and Calemba Islands, 3500 ft., *Welwitsch*, 6933! marshy places at Luxillo, *Welwitsch*, 6934! Dammaraland, *Een!*

Mozamb. Dist. British Central Africa: Boruma, on the Zambesi, *Menyharth*, 672 partly! 1062! Nyasaland: Elephant Marsh, below Mbewe, *Scott!* and without precise locality, *Whyte*, 84!

General in the tropics and warm temperate regions of the Old World; extending through Polynesia to the Philippines.

Also twice received from Mexico.

29. **C. microlepis,** *Boeck. in Flora*, 1879, 551. Stems slender, at the top trigonous, not triquetrous. Spikelets whitish. Glumes more elongate and less truncate than in *C. difformis*, Linn. Nut more elongate and narrower than in *C. difformis*, Linn.; otherwise as *C. difformis*, Linn.—C. B. Clarke in Journ. Linn. Soc. xxi. 137, and in

Durand & Schinz, Conspect. Fl. Afr. v. 569. *C. Afzelii*, var. *capillifolius*, Boeck. in Flora, 1879, 547 partly.

Upper Guinea. Niger Territory: Jeba, on the Niger, *Barter!*

Nile Land. British East Africa: Bongo; Gir, *Schweinfurth*, 2195! Jur; Jur Ghattas, *Schweinfurth*, 2328!

This might be treated as a variety of *C. difformis*, Linn.

30. **C. dichroostachyus,** *Hochst. in Flora*, 1841, *Intell.* 21. Glabrous, stout. Rhizome 4–8 in. long, $\frac{1}{5}$ in. diam., with chestnut scales. Stems $1\frac{1}{2}$–3 ft. long, subsolitary, at the top $\frac{1}{5}$ in. in diam., acutely triquetrous or almost 3-winged. Leaves $\frac{1}{2}$–$\frac{3}{4}$ the length of the stem, $\frac{1}{4}$–$\frac{1}{3}$ (sometimes $\frac{1}{2}$) in. broad. Umbel lateral, 2–5 in. in diam., compound; bracts 3–4, lowest up to 6–8 by $\frac{1}{3}$ in., as though a continuation of the stem. Spikes of 3–5 spikelets, digitate, numerous, bractless. Spikelets whitish with chestnut spots, $\frac{1}{6}$ by $\frac{1}{24}$–$\frac{1}{16}$ in., compressed, 6–14-flowered. Glumes closely packed, boat-shaped, 1-nerved, obtuse. Stamens usually 2; anthers short-oblong, hardly exserted. Style very short; branches 3, linear, hardly exserted. Nut $\frac{3}{4}$ the length of the glume, trigonous, ellipsoid, pyramidal at both ends, smooth, yellow-brown.—A. Rich. Tent. Fl. Abyss. ii. 481; Boeck. in Linnæa, xxxv. 587; Oliver in Trans. Linn. Soc. ser. 2, Bot. ii. 352; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 137, and in Journ. Bot. 1884, 16 in Obs.; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 556; K. Schum. in Engl. Pfl. Ost-Afr. C. 120; Engl. Hochgebirgsfl. Trop. Afr. 141; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 103; Rendle in Cat. Afr. Pl. Welw. ii. 115. *C. Andschoa*, A. Rich. Tent. Fl. Abyss. ii. 481. *C. scirpoides*, R. Br. in Salt, Abyss., Append. 63, name only; Fresenius in Abhandl. Mus. Senckenb. ii. 149, not of Presl. *C. Fresenii*, Steud. Nomencl. ed. 2, i. 469.

Nile Land. Abyssinia: Tigre; Debra-Eski, *Schimper*, 238! at the foot of Mount Scholoda, *Schimper*, 273! 391! Anadehr, 7800 ft., *Schimper*, 844! Mettgalo, 9840 ft., *Schimper*, 857! and without precise locality, *Schimper*, 953! *Salt! Quartin-Dillon & Petit!* British East Africa: Kariandusi River, 6000 ft., *Scott-Elliot*, 6632! *Gregory!*

Lower Guinea. Angola: Huilla; near the River Mupanda, 5000 ft., *Welwitsch*, 6864!

Mozamb. Dist. German East Africa: Kilimanjaro, 5000–6000 ft., *Johnston! Volkens*, 1417! 2277! Usambara; Heboma, *Holst*, 2555! British Central Africa: Nyasaland; Mount Zomba, 4000–6000 ft., *Whyte!*

Also in Madagascar and Yunnan.

31. **C. phæorhizus,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 119. Glabrous. Rhizome creeping, slender. Stems 1 ft. long, approximate, slender, at the top triquetrous. Leaves often as long as the stem, $\frac{1}{8}$–$\frac{1}{5}$ in. broad. Umbel compound; rays 4–5 up to $2\frac{1}{2}$ in. long; bracts overtopping the umbel, similar to the leaves. Spikelets 2–5 together, digitate, $\frac{1}{5}$–$\frac{1}{3}$ in. long, 10-flowered, chestnut-coloured. Glumes obtuse, hardly mucronate, chestnut with 3 green nerves on the keel. Style short; branches 3, scarcely exserted. Nut $\frac{1}{2}$ as long as the glume, obovoid, truncate, whitish.—*C. haspanoides*, C. B. Clarke in Durand &

Schinz, Conspect. Fl. Afr. v. 565, name only; K. Schum. in Engl. Pfl. Ost-Afr. C. 119.

Mozamb. Dist. German East Africa: Kilimanjaro, 5000–6500 ft., *Taylor!* *Volkens*, 2275!

This differs little from some large examples of *C. Haspan*, but by the dark chestnut-colour and rather larger glumes.

32. **C. Haspan,** *Linn. Sp. Pl. ed.* 2, 66 *partly, not of Linn. Herb.* Glabrous. Rhizome long-creeping, $\frac{1}{5}$ in. thick, sometimes slender; plants frequently flower the first year. Stems distant on long-creeping rhizomes, more often close together, varying from 4 to 28 in. long, at the apex from $\frac{1}{25}$ in. diam. and trigonous to $\frac{1}{8}$ in. diam. and triquetrous or 3-winged. Leaves often short, or hardly any, sometimes long or overtopping the stem $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Umbel usually compound or decompound, rarely simple, small or large; bracts usually 2–3, lower suberect shorter than the umbel, but sometimes far overtopping the umbel. Spikelets 2–6 together, digitate, $\frac{1}{5}$–$\frac{1}{2}$ by $\frac{1}{25}$–$\frac{1}{12}$ in., much compressed, 10–40-flowered. Glumes ovate, obtuse, obscurely or not mucronate, 1–3-nerved on the keel, dusky green or purple-reddish. Stamens 3–2; anthers linear-oblong. Style short; branches 3, scarcely exserted. Nut $\frac{1}{3}$–$\frac{1}{2}$ the length of the glume, ovoid or obovoid, scabrid or nearly smooth, pallid or brown.—Kunth, Enum. ii. 34; Benth. in Hook. Niger Fl. 550 partly; Boeck. in Linnæa, xxxv. 574, var. *a*, and in Flora, 1879, 550 partly; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 600, and in Durand & Schinz, Conspect. Fl. Afr. v. 564; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 136; Boeck. in Engl. Gazelle Reise, Bot. 15; K. Schum. in Engl. Pfl. Ost-Afr. C. 119; Durand & Schinz, Études Fl. Congo, i. 289; De Wild. & Durand in Comptes-rendus Soc. bot. Belg. xxxvi. 89; Urban, Symb. Antill. ii. 25; Rendle in Cat. Afr. Pl. Welw. ii. 114.

Upper Guinea. Senegambia, *Heudelot*, 833! Sierra Leone: Kundita, in the valley of the River Scarcies, *Scott-Elliot*, 5039! and without precise locality, *Don!* Liberia; Monrovia, *Naumann* (ex *Boeckeler*). Lagos: Abeokuta, *Irving!* Niger Territory: Nupe, *Barter*, 1572! on the sandy banks of the River Nun, *Vogel*, 13!

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2054! near Mombasa, *Hildebrandt*, 2045!

Lower Guinea. Gaboon River, *Jardin!* Lower Congo: Lutete, 1000–1750 ft., *Hens*, 78! 158! 248! Kisantu, *Gillet*, 6! 139! 988! Leopoldville, *Luja*, 38! 62! and without precise locality, *Smith*, 19! 47! Angola: Ambaca, *Welwitsch*, 7097! Pungo Andongo, 3500 ft., *Welwitsch*, 6908! 6932! Golungo Alto, *Welwitsch*, 7086! Ambriz, *Welwitsch*, 7035! 7035B!

Mozamb. Dist. German East Africa: Lake Yipe, near Kilimanjaro, 2000 ft., *Volkens*, 2388! Usambara; banks of a stream near Tanga, *Holst*, 2045! Unyamwezi; Tabora, *Stuhlmann*, 579! Nguru? Wadiboma, *Fischer*, 629! Karagwe; Bukoba, *Stuhlmann*, 995! 1610! Portuguese East Africa: in rice-fields, Quilimane, *Scott!* British Central Africa: Nyasaland; Zomba Rock, *Whyte!* by the Karonga River, *Scott!* Ngamiland; Lake River, *Lugard*, 10!

A rice-field weed in all hot countries.

33. **C. flavidus,** *Retz. Obs.* v. 13. Annual, living about 3 months. Stems 2–8 in. long, tufted, sometimes rather stout but weak, obtusely trigonous (not acutely triquetrous). Leaves generally longer than the stem, often $\frac{1}{8}$–$\frac{1}{6}$ in. broad, weak. Umbel usually very compound, and denser than that of *C. Haspan*, when ripe yellow or finally blackening; bracts usually overtopping the umbel, similar to the leaves. Stamen usually 1 (rarely 2). Nut plano-convex, when ripe marble white; otherwise as *C. Haspan*.—Vahl, Enum. ii. 334; C. B. Clarke in Journ. Linn. Soc. xx. 287, xxi. 122, in Hook. f. Fl. Brit. Ind. vi. 600, and in Durand & Schinz, Conspect. Fl. Afr. v. 563; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 136; K. Schum. in Engl. Pfl. Ost-Afr. C. 119; Durand & Schinz, Études Fl. Congo, i. 288; Rendle in Cat. Afr. Pl. Welw. ii. 114. *C. Haspan*, Rottb. Descr. et Ic. 36, t. 6, fig. 2; Linn. Sp. Pl. ed. 2, 66 partly; Benth. in Hook. Niger Fl. 550 partly; Oliver in Trans. Linn. Soc. xxix. 165. *C. Haspan*, var. *a*, Boeck. in Linnæa, xxxv. 574 in large part, and in Flora, 1879, 550 partly. *C. leptostachys*, Nees in Linnæa, ix. 285; Steud. Syn. Pl. Glum. ii. 33. *C. pulvinatus*, T. Thoms. in Speke, Nile, Append, 653. *C. microcarpus*, Boeck. in Abhandl. naturw. Ver. Bremen, vii. 37.

Upper Guinea. Senegal, *Roger*, 38! *Heudelot*, 325! *Adanson*, 164! *Perrottet*, 877! Senegambia: Richard Tol, Dollinger, 14! Niger Territory; Nupe, *Barter*, 1566!

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurlh*, ser. iii. 194! Unyoro, *Speke & Grant!*

Lower Guinea. Lower Congo: Lutete, 2000 ft., *Hens*, A, 360! Angola: Loanda; ponds near Forte de Conceiçao, *Welwitsch*, 7077! Pungo Andongo; ponds near Quisonde, *Welwitsch*, 6917! Lagoa de Quibinda, *Welwitsch*, 6920! between Condo and Quisonde, *Welwitsch*, 6924!

Mozamb. Dist. Zanzibar, *Blackburn! Kirk!* German East Africa: Usambara; Amboni, *Holst*, 2676! Nguru? Wadiboma, *Fischer*, 628! Mkana River, *Stuhlmann*, 125! Portuguese East Africa: Quilimane, *Scott!* British Central Africa: Boruma, on the Zambesi, *Menyharth*, 1051 partly! Nyasaland; Kondowe to Karonga, 2000–6000 ft., *Whyte!*

Also in the Seychelles, South-east Asia, and North Australia.

This plant is very unlike the typical large *C. Haspan*, but is difficult to separate from small tufts of *C. Haspan* flowering the first season. It may generally be distinguished by the long leaves and bracts which very rarely occur in *C. Haspan*.

34. **C. podocarpus,** *Boeck. in Flora*, 1879, 551. Glabrous. Rhizome seen $\frac{1}{2}$ by $\frac{1}{12}$ in., clothed by striate scales. Stems 10 in. long, tufted, slender, tough, obtusely trigonous. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{8}$ in. broad. Umbel simple; rays 2–4, up to $1\frac{1}{2}$ in. long; bracts 3, lowest suberect up to 4–8 in. long, similar to the leaves. Spikes of 3–7 spikelets, ebracteate. Spikelets $\frac{2}{5}$ by $\frac{1}{10}$ in., a little compressed, somewhat turgid, 8–12-flowered, variegated with red-purple. Glumes ovate, obtuse. Stamens 3; anthers small, nearly square. Style, including the 3 branches, shorter than the nut. Nut $\frac{1}{2}$ the length of the glume, broad ellipsoid, trigonous but much flattened on the anterior angle, suddenly narrowed into a minute stalk, smooth, black.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 572.

Upper Guinea. Interior of Senegal, *Lécard*, 98! with capillary stem and leaves, *Lécard*, 165 partly!

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2005!

35. **C. tenax,** *Boeck. in Linnæa*, xxxv. 504. Glabrous. Rhizome very short. Stems 4–16 in. long, tufted at the top, trigonous. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Umbel simple, rarely somewhat compound; rays 1–7, 0–2 in. long; bracts overtopping the umbel, similar to the leaves, often slightly distant. Spikes of 3–16 digitate spikelets, chestnut-black to chestnut-brown, spikelets $\frac{1}{5}$–$\frac{3}{5}$ by $\frac{1}{12}$ in., compressed, 8–20-flowered, linear with parallel sides. Glumes ovate, obtuse, boat-shaped, hard, often shining. Stamens 3. Style much shorter than the nut; branches 3, linear, long. Nut $\frac{1}{2}$–$\frac{3}{5}$ the length of the glume, trigonous, narrowly ellipsoid, finally black.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 578, and in Dyer, Fl. Cap. vii. 170; K. Schum. in Engl. Pfl. Ost-Afr. C. 118; Durand & Schinz, Études Fl. Congo, i. 293; Rendle in Cat. Afr. Pl. Welw. ii. 111. *C. Grantii*, Boeck. ex Oliver in Trans. Linn. Soc. xxix. 164. *C. actinostachys* and *C. andongensis*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 140, and *C. sabulicolus*, Ridley, l.c. 136. *C. andongensis*, Rendle in Cat. Afr. Pl. Welw. ii. 111. *C. monroviensis*, Boeck. in Engl. Jahrb. v. 90, and in Engl. Gazelle Reise, Bot. 14. *Cyperus*, sp. n. 15, T. Thoms. in Speke, Nile, Append. 654.

Upper Guinea. Liberia: Monrovia, *Naumann* (ex *Boeckeler*).

Nile Land. British East Africa; Uganda, *Scott-Elliot*, 7494! Rabai Hills and Tsimba (Shimba) Mountains, near Mombasa, *Taylor!*

Lower Guinea. Lower Congo: Lutete, 2000 ft., *Hens*, 360 partly! Kisantu, *Gillet*, 1584! Angola: Ambriz, *Welwitsch*, 7038! Barra do Bengo, *Welwitsch*, 7049! Pungo Andongo, 3500 ft., *Welwitsch*, 6794! 6928! 6929! 6931! Huilla, 5000 ft., *Welwitsch*, 6866! 6874! River Nene, *Newton*, 21!

Mozamb. Dist. Zanzibar, *Taylor! Kuntze*, 304! German East Africa: Usambara; Tanga, *Holst*, 2034A! Unyamwezi; near Tabora, 3800 ft., *Speke & Grant!* British Central Africa: Nyasaland, *Buchanan*, 1439! Rhodesia; Leshumo Valley, *Holub!*

Also in Natal and the Transvaal.

The spikelets merely vary a good deal in length in this species; I see no other ground for the variety of names given it.

36. **C. Hensii,** *Durand & Schinz, Études Fl. Congo*, i. 289. Glabrous. Stems 16 in. long, decumbent at the base (not annual), at the top $\frac{1}{12}$ in. in diam., rounded. Leaves $\frac{1}{3}$ the length of the stem, $\frac{1}{8}$ in. wide, inrolled when dry; sheaths torn, scarious, red-brown. Umbel simple, contracted; rays 1–6, 0–$\frac{1}{2}$ in. long, bracts 4–5, up to $2\frac{1}{2}$ in. long, similar to the leaves, dilated at the base. Spikelets 12–20 to a spike, digitate, $\frac{1}{2}$ by $\frac{1}{16}$ in., compressed, pale brown, 16–24-flowered, with parallel sides; rhachilla somewhat zigzag, with narrow hyaline wings. Glumes close-packed, ovate, obtuse, nerved only on the keel. Style hardly any; branches 3, linear, hardly longer than the nut. Nut

$\frac{1}{2}$ the length of the glume, trigonous, broadly oblong, smooth, chestnut-red, dotted.—De Wild. & Durand, Ill. Fl. Congo, i. 15, t. 8.

South Central. Congo Free State: Lisha, 1000 ft., *Hens*, C, 364!

37. **C. Boehmii,** *Boeck. in Engl. Jahrb.* v. 498. Stems 15 in. long, slender, roundish. Leaves $\frac{1}{3}$ the length of the stem, $\frac{1}{12}$–$\frac{1}{8}$ in. broad. Umbel-rays 10–12, up to 2 in. long, very slender, bracts as long as the umbel, linear. Spikelets 20–40 to a spike, up to 1 by $\frac{1}{16}$ in., 30-flowered, black; glumes rather distant, otherwise as *C. tenax*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 550; K. Schum. in Engl. Pfl. Ost-Afr. C. 118.

Nile Land. British East Africa: Rabai Hills and Tsimba (Shimba) Mountains, *Taylor!*

Mozamb. Dist. Zanzibar, *Schmidt*, 59! German East Africa: Karagwe; Bukoba, *Stuhlmann*, 1104! Unyamwezi; Msalala, *Hannington!* Ugalla district, *Boehm*, 75!

The long, very slender spikelets are handsome, and they differ from those of *C. tenax* in the glumes being more distant, but in some examples they are hardly longer than in *C. tenax*.

38. **C. apricus,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 141. Glabrous. Rhizome seen $\frac{1}{2}$–$1\frac{1}{2}$ in. long, densely covered with coarse stiff fibres (the remains of scales). Stems 2–10 in. long, slender, at the top trigonous, at the base surrounded by stiff fibres, approximate. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{24}$ in. broad. Umbel-rays 1–4, up to $1\frac{1}{2}$ in. long, often very short, or inflorescence contracted into 1 head; bracts 2–3, much overtopping the inflorescence, $\frac{1}{24}$ in. broad. Spikelets 3–12 to a spike, subdigitate, brown-red, $\frac{1}{4}$–$\frac{1}{2}$ by $\frac{1}{12}$ in., compressed, 8–22-flowered, with parallel sides. Glumes ovate, obtuse or very minutely apiculate, 7–9-striate. Filaments long, exserted, slender; anthers linear-oblong. Style linear, long; branches 3, linear, about $\frac{1}{2}$ the length of the undivided part of the style.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 548, and in Bull. Herb. Boiss. iv. Append. iii. 29; K. Schum. in Engl. Pfl. Ost-Afr. C. 118; Rendle in Cat. Afr. Pl. Welw. ii. 118. *C. Schinzii* and *C. purpureus*, Boeck. in Verhandl. Bot. Ver. Brandenb. xxix. 45.

Lower Guinea. Angola: Pungo Andongo; between Muta Lucala and Quibonda, *Welwitsch*, 6915! and without precise locality, *Welwitsch*, 7163! 9164! German South-west Africa: Amboland; Oshiheke, *Schinz*, 384! Olukonda, *Schinz*, 383!

Schinz, 383 (type of *C. purpureus*, Boeck.), has 4 spikes; Schinz, 384 (type of *C. Schinzii*, Boeck.), has 1 spike; otherwise they seem to me identical. The branches being so much shorter than the undivided part of the style separates this species completely from most species of *Cyperus* except *C. semitrifidus*, Schrader (Cape), which has much broader spikelets. *C. holostigma* (n. 6 above) is possibly a depauperated state of *C. apricus*; it has the style subentire and the spikelets black.

39. **C. Adansoni,** *C. B. Clarke in Durand & Schinz. Conspect. Fl. Afr.* v. 546. Glabrous. Rhizome hardly any. Stems 3 in. long, at the top trigonous, at the base woody, approximate. Leaves $4\frac{1}{2}$ by $\frac{1}{16}$–$\frac{1}{12}$ in., green, weak. Spikes 1, or with a second on a ray $\frac{3}{5}$ in. long; bracts

2–3, far overtopping the inflorescence, very narrow. Spikelets 3–10 to a spike, nearly digitate, $\frac{2}{5}$ by $\frac{1}{8}$ in., compressed, linear-lanceolate, 20–30-flowered, pallid; rhachilla wingless. Glumes closely packed, ovate, minutely mucronate, strongly 11–13-ribbed over their entire width. Stamens 3; filaments broad. Style deeply 3-fid. Nut $\frac{2}{5}$ the length of the glume, obovoid, trigonous, ashy-black.

Upper Guinea. Senegal, *Adanson!*

40. **C. sphærospermus,** *Schrad. Anal. Fl. Cap.* 8. Glabrous. Rhizome horizontal, seen 2–4 in. by $\frac{1}{5}$ in., nodose, with brown-red scales. Stems 6–14 in. long, approximate, tough, trigonous or triquetrous at the top. Leaves $\frac{1}{2}$ the length of the stems or sometimes overtopping the stems, $\frac{1}{8}$–$\frac{1}{6}$ in. broad, tough. Umbel compound or simple, 1–5 in. in diam.; bracts about the length of the inflorescence, or frequently shorter, the longest sometimes only 1 in. Spikes of 3–8 digitate spikelets, from straw-colour to a rich brown. Spikelets $\frac{1}{2}$ by $\frac{1}{10}$–$\frac{1}{8}$ in., much compressed, 10–30-flowered. Glumes close-packed, muticous, paler on the keel, obscurely or not striate. Stamens 3; anthers narrow oblong. Style very short; branches 3, linear, long. Nut $\frac{1}{4}$–$\frac{1}{3}$ the length of the glume, i.e. very small, trigonous, subspherical, pallid, ultimately brown.—Kunth, Enum. ii. 106; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 577, and in Dyer, Fl. Cap. vii. 172; K. Schum. in Engl. Pfl. Ost-Afr. C. 119; Rendle in Cat. Afr. Pl. Welw. ii. 115. *C. denudatus*, Boeck. in Linnæa, xxxv. 576 partly; C. B. Clarke in Journ. Linn. Soc. xxi. 124. *C. huillensis*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 139, incl. var. *aphyllus* (which has long leaves).

Nile Land. Somaliland, 3500 ft., *Hildebrandt*, 873c!

Lower Guinea. Angola: Huilla; in various places near Humpata, *Welwitsch*, 6865! 6867! 6868! 6869! banks of a stream near Bumbo, *Welwitsch*, 6889!

Also in Madagascar and common throughout South Africa.

C. denudatus, Linn. f., is common throughout South Africa, and hardly differs from *C. sphærospermus* except in the want of leaves. The two have been much mixed, and finally united by Boeckeler. It is remarkable that the type example of Ridley's var. *aphyllus*, in herb. Welwitsch., has long leaves.

Var. *triqueter*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 578, and in Dyer, Fl. Cap. vii. 172. Stems very rigid, acutely trigonous at the top.

Lower Guinea. German South-west Africa: Amboland; Olukonda, *Schinz*, 387!

Also in South Africa.

This variety differs from the type in unimportant points only. In recording it, I am able to explain that it was sent me marked *Cyperus triqueter*, as I supposed, by Boeckeler; and I have given it the varietal name *triqueter* thereon. But I find that it was erroneously named *triqueter*, not by Boeckeler; and that Boeckeler's *triqueter* was *C. amabilis* above.

41. **C. flabelliformis,** *Rottb. Descr. et Ic.* 42, *t.* 12, *fig.* 2. Glabrous. Rhizome seen stout, horizontal; also plants flowering weakly, in tufts, apparently the first season. Stem 3–2 ft. long, stout, at the top some-

times terete with very fine numerous striæ, sometimes fluted with fewer deep striæ, sometimes nearly triangular or 6-angular. Leaves 0, except on the first sterile shoots. Umbel 4–12 in. in diam., usually compound ; primary rays numerous (often 6–10), subequal in length, not very slender ; bracts 8–12, subequal, overtopping the umbel, often at the base $\frac{1}{8}$–$\frac{1}{4}$ in. apart (i.e. umbel subcorymbose), up to 14 by $\frac{1}{2}$–$\frac{2}{3}$ in., with lanceolate (not caudate) tips. Spikes of 2–15 digitate spikelets, whitish-yellow, cinnamon-coloured or rust-coloured, sometimes chestnut-spotted. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{12}$ in., much compressed, 10–20-flowered. Glumes close-packed, very acutely keeled, hard, shining, not distinctly ribbed, tip trigonous, pointed. Stamens 3. Style short ; branches 3, long. Nut $\frac{1}{2}$ the length of the glume, triquetrous, obovoid, slightly apiculate, becoming brown.—Kunth, Enum. ii. 32 ; A. Rich. Tent. Fl. Abyss. ii. 479 ; Boeck. in Linnæa, xxxv. 566 (excl. the Costa Rica plant) ; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 135 ; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 562 ; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 48, 102 ; K. Schum. in Engl. Pfl. Ost-Afr. C. 119 ; Durand & Schinz, Études Fl. Congo, i. 287 ; De Wild. & Durand in Comptes-rendus Soc. bot. Belg. xxxvi. 88 ; Rendle in Cat. Afr. Pl. Welw. ii. 114. *C. proximus*, Steud. Syn. Pl. Glum. ii. 19. *C. flagellatus*, Hochst. in Flora, 1841. i. Intell. 21 ; Engl. Hochgebirgsfl. Trop. Afr. 140. *C. petersianus*, Boeck. in Peters, Reise Mossamb. Bot. 537, and in Linnæa, xxxv. 567. *C. Ginge*, Welw. Apont. 586. *C. sexangularis*, Fenzl ex Steud. l.c.

Nile Land. Upper Sennar : Fazokl, *Kotschy*, 565 ! Eritrea : Arrot Valley, 4300 ft., *Schweinfurth & Riva*, 684 ! below Geleb, 5500 ft., *Schweinfurth & Riva*, 1382 ! Abyssinia : near Adowa, *Schimper*, 55 ! and without precise locality, *Schimper*, 131 ! 1590 ! 1941 ! *Quartin-Dillon & Petit !* Somaliland : Golis Range, *Mrs. Lort-Phillips !* British East Africa : Kiboko, *Scott-Elliot*, 6679 ! Taita ; Ndi Mountain, *Hildebrandt*, 2593 ! Ribe, *Wakefield !*

Lower Guinea. Lower Congo : Kisantu, *Gillet*, 464 ! Congo, *Burton ! Smith !* Angola : Malange, *Buchner !* Golungo Alto and Golungo Baixo ; plentiful everywhere in marshy places, *Welwitsch*, 7103 ! Mossamedes ; by lakes at the mouth of the River Giraul, *Welwitsch*, 6882 !

Mozamb. Dist. Zanzibar, *Taylor ! Peters*, 15 ! German East Africa : Kilimanjaro : Chagga distr., *New ! Volkens*, 1682 ! Usambara ; Lutindi, *Holst*, 3231 ! Portuguese East Africa : banks of ponds at Shupanga, *Scott !* Expedition Island, in the Zambesi, *Kirk !* British Central Africa : Boruma, on the Zambesi, *Menyharth*, 1054 ! Nyasaland ; Songue and Karonga, *Whyte !* 72 ! between Mpata and the commencement of the Tanganyika Plateau, 2000–3000 ft., *Whyte !* Monkey Bar, *Whyte !* Manganja Hills, *Meller !* Shire Valley, *Scott !* and without precise locality, *Buchanan*, 493 !

Also in South Africa, the Mascarene Islands and Arabia.

42. **C. alternifolius,** *Linn. Mant.* 28, *and Linn. Herb.* Primary and secondary rays of the umbel very slender. Nut lanceolate or oblong, finally black ; otherwise as *C. flabelliformis*, Rottb.—Jacq. Ic. Pl. ii. 8, t. 298 ; Kunth, Enum. ii. 33 ; Boeck. in Linnæa, xxxv. 568 ; C. B. Clarke in Journ. Linn. Soc. xx. 289, xxi. 130, and in Durand &

Schinz, Conspect. Fl. Afr. v. 547; K. Schum. in Engl. Pfl. Ost-Afr. C. 119.

Mozamb. Dist. German East Africa: Usambara (ex *Schumann*).

Mascarene Islands.

This plant has been much cultivated for more than a century. It is so exceedingly near *C. flabelliformis* that I have doubted whether it may not be a cultivated state; the only wild plants which I sort with *C. alternifolius* are from the Mascarene Islands. The Usambara example cited by K. Schumann may be exactly my Mascarene *C. alternifolius*, or may be one of the forms which I sort with *C. flabelliformis*. The leaves described by Kunth and others are an error.

43. **C. sexangularis,** *Nees in Linnæa*, ix. 284, *and* x. 135. Stem at the top trigonous or triquetrous, each plane face with 3–1 striæ, of which the central one is strongest, so that in the typical form the stem is subequally hexagonal at the top; otherwise as *C. flabelliformis.*—Kunth, Enum. ii. 32; Boeck. in Linnæa, xxxv. 568; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 577, in Bull. Herb. Boiss. iv. Append. iii. 31, and in Dyer, Fl. Cap. vii. 175.

Mozamb. Dist. British Central Africa: Boruma, on the Zambesi, *Meyharth*, 1055!

Frequent in South Africa.

The typical subequally hexagonal-stemmed plant seems distinct enough from the exactly cylindric-stemmed (finely striated) *C. flabelliformis.* But Bolus has supplied intermediate states, till I find it hard to distinguish the species. So far as my experience goes, this is the result throughout the Order *Cyperaceæ* where the discrimination of two species hangs on the roundness or 3–4-angularity of the stem alone.

44. **C. denudatus,** *Linn. f. Suppl.* 102. Glabrous. Rhizome horizontal, thick. Stems 12–32 in. long, at the top triquetrous or trigonous, sometimes triquetrous their whole length and almost 3-winged. Leaves hardly any; the highest sometimes $\frac{1}{2}$–$1\frac{1}{2}$ in. long, green, bayonet-shaped, but usually a mere prolongation of the sheath. Umbel, bracts, spikelets and nuts as of *C. sphærospermus*, Schrad.—Kunth, Enum. ii. 36; Boeck. in Linnæa, xxxv. 576 partly; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 555, in Bull. Herb. Boiss. iv. Append. iii. 29, and in Dyer, Fl. Cap. vii. 173; K. Schum. in Engl. Pfl. Ost-Afr. C. 119; Rendle in Cat. Afr. Pl. Welw. ii. 115.

Nile Land. British East Africa: Mombasa, *Hildebrandt*, 2045! Ndoro, on Mount Kenia, *Gregory*, 78!

Lower Guinea. Angola: Huilla; ponds near Nene, *Welwitsch*, 6861!

Mozamb. Dist. Zanzibar, *Taylor!* German East Africa: Karagwe; Bukoba, *Stuhlmann*, 1001! Unyamwezi; Gonda (Igonda), *Boehm*, 64! Niansa, *Stuhlmann*, 872! British Central Africa: on an island at Victoria Falls, *Kirk!*

Also in South Africa and Madagascar.

Var. *delicatulus*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 556. Rhizome stout. Stems 2 ft. long, stout, triquetrous, almost 3-winged. Umbel dense. Spikelets numerous, about $\frac{1}{16}$ in. broad. Glumes obtuse, chestnut-red.—*C. denudatus*, T. Thoms. in Speke, Nile, Append. 654; Oliver in Trans. Linn. Soc. xxix. 165.

Mozamb. Dist. German East Africa: Kilimanjaro, 6600, *Taylor!* Unyamwezi; boggy ground near Kazeh (Tabora), *Speke & Grant!*

The varietal name *delicatula* refers only to the slenderness of the spikelets.

45. **C. lucentinigricans,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 119. Stem thick, at the top triquetrous. Umbel $2\frac{1}{2}$ in. in diam., dense; bracts $\frac{1}{2}$ in. long, triangular. Spikelets $\frac{1}{3}$–$\frac{1}{4}$ by $\frac{1}{16}$ in., chestnut-coloured. Glumes obtuse, one-coloured, striate.

Mozamb. Dist. German East Africa: Usambara, *Holst*, 3851!

The head of this at Kew is very near *C. denudatus*, Linn. f., var. *delicatula*; it differs in the shining black-chestnut colour; the glumes are slightly larger and more striate.

46. **C. marginatus,** *Thunb. Prodr.* 18. Glabrous. Rhizome woody. Stems 1–3 ft. long, hard, strong, terete, at the top terete or obscurely trigonous. Leaves hardly any; the top sheath produced lanceolate 1–2 in., but hardly green or with any blade. Umbel simple or compound, contracted, with numerous brownish or somewhat chestnut-coloured spikelets; rays unequal; bracts 5–2, usually much shorter than the umbel, but sometimes as long. Spikelets 6–38-flowered, variable in length. Nut nearly $\frac{2}{5}$ the length of the glume, ellipsoid, rather larger than that of *C. denudatus*, Linn. f.; otherwise like *C. denudatus*.—Thunb. Fl. Cap. ed. Schultes, 100; Boeck. in Linnæa, xxxv. 571; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 136; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 568, in Bull. Herb. Boiss. iv. Append. iii. 30, and in Dyer, Fl. Cap. vii. 173; Rendle in Cat. Afr. Pl. Welw. ii. 114.

Lower Guinea. Angola: Benguela; in damp maritime places south of the city, and near the banks of the River Bero, *Welwitsch*, 6859! German South-west Africa: Hereroland, *Fleck*, 161 partly! 897! Damaraland, *Een!*

Abundant in South Africa.

47. **C. prolifer,** *Lam. Ill.* i. 147. Glabrous. Rhizome creeping. Stems 12–28 in. long, terete or at the top obscurely trigonous. Leaves hardly any. Umbel of 50–100 subequal primary slender rays; bracts numerous, 0–1 in. long. Spikelets 1–5 together, digitate, $\frac{1}{4}$ by $\frac{1}{15}$ in., 6–12-flowered, dusky brown. Glumes boat-shaped, obtuse, apiculate. Stamens 3. Style as long as the nut; branches 3, linear, somewhat exserted. Nut $\frac{1}{4}$ the length of the glume, minute, ovoid, trigonous, pallid.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 572; K. Schum. in Engl. Pfl. Ost-Afr. C. 119. *C. æqualis*, Vahl, Enum. ii. 320; Kunth, Enum. ii. 37; Boeck. in Peters, Reise Mossamb. Bot. 538, excl. var. β, and in Linnæa, xxxv. 577, excl. var. β; C. B. Clarke in Journ. Linn. Soc. xx. 287, xxi. 123.

Nile Land. British East Africa: Tsimba (Shimba) Mountains, *Taylor!*

Mozamb. Dist. Zanzibar, *Kuntze*, 206! *Hildebrandt*, 1066! German East Africa: Zanguebar, *Kirk*, 3! Portuguese East Africa: Mozambique, *Peters!*

Also in the Mascarene Islands.

48. **C. isocladus,** *Kunth, Enum.* ii. 37. Stem trigonous, at the top triquetrous, often very minutely scabrous on the 3 faces; otherwise

as in *C. prolifer*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 565, and in Dyer, Fl. Cap. vii. 175. *C. æqualis*, var. β, Boeck. in Peters, Reise Mossamb. Bot. 538, and in Linnæa, xxxv. 578.

Mozamb. Dist. Zanzibar, *Taylor!* Portuguese East Africa: Mozambique, *Peters!*

Common in South Africa.

As in so many cases where species of *Cyperaceæ* have been established on a difference in the stems (round or trigonous), it is a matter of taste whether the present plant be arranged as a species or as a variety of *C. prolifer*.

49. **C. dichromenæformis,** var. **major,** *Boeck. in Flora*, 1879, 549. Rhizome woody, nodose. Stems 12–30 in. long, at the top unequally trigonous, almost flattened. Leaves nearly as long as the stem, $\frac{1}{3}$–$\frac{1}{2}$ in. broad, 3-nerved, flat, grass-like. Head 1 of 12–34 spikelets; bracts 4–5, lowest up to 10 by $\frac{1}{3}$ in., similar to the leaves. Spikelets $\frac{1}{2}$ by nearly $\frac{1}{6}$ in., much flattened, 12–20-flowered, straw-coloured. Glumes boat-shaped, ovate, obtuse, distant on the rhachilla, in fruit hardly imbricate, obscurely many-striate, on the margins and keel very minutely hairy. Stamens 3; anthers almost crested. Style shorter than the nut; branches 3, long. Nut $\frac{2}{3}$ the length of the glume, trigonous, shining brown.—Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 132; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 556; Durand & Schinz, Études Fl. Congo, i. 285; Rendle in Cat. Afr. Pl. Welw. ii. 111.

Upper Guinea. Togo; *Buettner*, 144!

Nile Land. British East Africa: Niamniam; Kulenjo, *Schweinfurth*, 3886!

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 295! Angola: Pungo Andongo; banks of the Rivers Cuanza and Cuije, *Welwitsch*, 6901! by springs on the more lofty rocks of the Præsidium, *Welwitsch*, 6902! 7149! Golungo Alto; on the edge of marshes, &c., on the more lofty heights of Queta, rather rare, *Welwitsch*, 7093!

South Central. Congo Free State: Monbuttu; Munza, *Schweinfurth*, 3461!

The typical *C. dichromenæformis*, Kunth, is from Brazil; it is a much smaller and weaker plant than the African, with no definite rhizome. The African plant is doubtless closely allied, either as a species or a geographic race.

50. **C. mapanioides,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* 568. Stolon $\frac{1}{8}$ in. in diam., covered by scales scarcely $\frac{1}{4}$ in. long. Stem 16 in. long, rather stout, acutely and equally triquetrous at the top. Leaves as long as the stem, $\frac{1}{3}$ in. broad, flat, 3-nerved. Head 1, very dense, of 50 spikelets; bracts 4–5, lowest up to 1 ft. long, similar to the leaves. Spikelets $\frac{2}{5}$ by $\frac{1}{6}$ in., moderately compressed, 10–16-flowered, pale brown or cinnamon-coloured. Glumes ovate, boat-shaped, very close-packed on the rhachilla, much imbricated in ripe fruit, tip narrow-triangular, hardly acute, nerves many, margins very minutely hairy. Stamens 3; connective not produced. Style short; branches 3, long. Nut $\frac{1}{2}$ the length of the glume, trigonous, shining-brown.—Durand & Schinz, Études Fl. Congo, i. 290; De Wild. & Durand, Ill. Fl. Congo, i. 47, t. 24.

Lower Guinea. Lower Congo; margin of Stanley Pool, 1000 ft., *Hens*, B, 7 ! 69 ! 389 !

Owing to the close packing of the glumes on the rhachilla, the spikelets of this species are very unlike those of *C. dichromenæformis*; but the two species agree in a great number of minute points and may prove to be but one.

51. **C. fertilis,** *Boeck. in Engl. Jahrb.* v. 90, vii. 331. Glabrous. Rhizome woody, seen short. Stems 2–6 in. long, at the top triquetrous. Leaves longer than the stem, lanceolate, $\frac{1}{3}$–$\frac{2}{3}$ in. broad, 3-nerved, flat. Umbel simple; primary rays 3–8, up to 8–12 in. long, flexuose, at the top triquetrous; bracts 4–7, similar to the leaves, lowest 4–6 in. long. Spikes digitate, of 1–4 spikelets, ebracteate, but not rarely subproliferous or rooting, then producing a leaf. Spikelets $\frac{2}{5}$ by $\frac{1}{5}$ in., ovate, much flattened, pallid, 10–20-flowered. Glumes ovate, obtuse, 11–15-striate; rhachilla slightly winged. Stamen 1; anther crested. Style very short; branches 3, long. Nut $\frac{2}{3}$ the length of the glume, ovoid, trigonous, smooth, brown, finally black.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 562; Durand & Schinz, Études Fl. Congo, i. 287; Rendle in Cat. Afr. Pl. Welw. ii. 113. *C. Lanceola*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 134.

Upper Guinea. Old Calabar River, *Mann*, 2332 ! *Holland*, 57 ! Cameroons: Rio del Rey, *Johnston !* Efulen, near the river, *Bates*, 237 ! Mungo, *Naumann*, *Buchholz* (ex *Boeckeler*), and without precise locality, *Buettner*, 551 ! *Braun*, 16 ! *Preuss*, 30 !

Lower Guinea. Gaboon River, *Mann*, 1021 ! Lower Congo; Bussindi, 1000 ft., *Hens*, C, 160 ! Stanley Pool, *Duchesne*, 206 ! Angola: Pungo Andongo; marshes of Mato do Pedro Cabondo, rather rare, *Welwitsch*, 6896 ! Golungo Alto: by streams at Calomba Queta, Zengas do Queta, and near Canguerasange, rare, *Welwitsch*, 7094 !

South Central. Congo Free State: Bangala, on the Congo, *Duchesne*, 20 !

This striking species is at once recognised by the umbel-rays being longer than the stems. In cultivation at Kew, the umbel-rays trail all round the plant.

52. **C. Mannii,** *C. B. Clarke in Durand & Schinz, Conspect Fl. Afr.* v. 568. Glabrous. Rhizome short, horizontal, clothed by brown scales. Stem 3–1 ft. long, at the top triquetrous, smooth. Leaves nearly as long as the stem, $\frac{1}{2}$ in. broad in the type plant (*Mann*, 1358), scarcely $\frac{1}{4}$ in. broad in *Mann*, 2107, 3-nerved. Umbel compound with many spikes 6 in. in diam.; bracts 5, lowest up to a foot long, similar to the leaves. Spikes of 3–6 clustered spikelets, pale reddish-brown, when young greenish. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{12}$ in., moderately compressed, 8–12-flowered. Glumes closely packed, ovate, acute, apiculate, scarcely mucronate, with 4 moderate striæ on each side, in fruit a bright red-brown. Stamens 3; anthers linear, connective elongated into a distinct crest. Style short; branches 3, long. Nut $\frac{2}{3}$ the length of the glume, ovoid, sharply trigonous, pyramidal at the top and base, smooth, brown, finally black.—K. Schum. in Engl. Pfl. Ost-Afr. C. 119. *C. leptocladus*, Boeck. in Linnæa, xxxv. 581; Engl. Hochgebirgsfl. Trop. Afr. 141, not of Kunth. *C. ingratus*, Hook. f. in Journ. Linn. Soc. vii. 224, not of Kunth. *C. elegans*, Ridley in Bolet. Soc. Brot. v. 208.

Upper Guinea. Cameroons: Cameroon Mountain, 7000–10,000 ft., *Mann*, 1358! 2107! *Johnston*, 46! and without precise locality, *Preuss*, 564! 571! 979! Fernando Po, 4000–7000 ft., *Mann*, 320! 1479!

Lower Guinea. Island of St. Thomas, 5800 ft., *Moller*, 23!

The present group of *Cyperus* is, in Tropical Africa, very difficult to divide into species. The above description is drawn from Mann, 1358, as a typical form; in this the stem is more than 3 feet high, and there are in the umbel more than 150 spikes containing more than 600 spikelets. Mann, 2107, is a foot high, slender, one stem carrying only 6 spikes and 35 spikelets, and is referred by Boeckeler to *C. leptocladus*, Kunth; but was marked by Hooker, f. as "= Mann, 1358," with which determination I agree.

53. **C. Deckenii,** *Boeck. in Linnæa*, xxxviii. 361. Glumes strong, red-brown or chestnut-red, with a small recurved mucro. Nut ½ the length of the glume, narrowly ellipsoid to oblong; otherwise as *C. Mannii*. —Boeck. in Decken, Reisen Ost-Afr. Bot. 72; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 555; K. Schum. in Engl. Pfl. Ost-Afr. C. 119; Engl. Hochgebirgsfl. Trop. Afr. 141. *C. leptocladus*, Oliver in Trans. Linn. Soc. ser. 2, Bot. ii. 353, not of Kunth. *C.* (*Mariscus*) *clarkeanus*, K. Schum. in Engl. Pfl. Ost-Afr. C. 123 (excl. syn.). *C. zambesiensis*, C. B. Clarke in Trans. Linn. Soc. ser. 2, Bot. iv. 53. *C. sambesiensis*, K. Schum. in Eng. Pfl. Ost-Afr. C. 121.

Mozamb. Dist. German East Africa: Kilimanjaro, 4900–8000 ft., *Volkens*, 650! 652! 704! *Johnston*, 84! *Kersten!* *Decken*, 126! *Meyer*, 273! *Taylor!* British Central Africa: Nyasaland; Mount Chiradzulu, *Meller!* Nyika Plateau, 6000–7000 ft., *Whyte!* Mount Zomba, 4000–6000 ft., *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!* Shire Highlands, *Scott-Elliot*, 8488! Mount Mlanje, *Whyte!* and without precise locality, *Buchanan*, 1001!

The type form of this species has the umbel rather loose, the spikelets longer and darker-coloured than those of *C. Mannii*. As to the synonymy, the plant of Kersten marked *Deckenii* by Boeckeler, that of Volkens marked *clarkeanus* by Schumann, and that of Johnston marked *leptocladus* by Oliver (all three from the same level on Kilimanjaro) have been placed side by side and admitted to be identical. Some of the Nyasaland material also appears identical; but other Nyasaland material, at present arranged as *Deckenii*, has very dense umbels, or paler or shorter spikelets, and may hereafter be separable. This plant in no wise approximates to the genus *Mariscus*; and it must have been by some error in ticketing that K. Schumann could have imagined that it was a *Mariscus* of mine.

54. **C. fischerianus,** *Schimper ex Hochst. in Flora*, 1841, i. *Intell.* 21. Glumes more distant on the rhachilla, in fruit not or hardly overlapping, pale, thin in texture, at the top rounded, thin, often torn, the nerve hardly ever excurrent. Nut ovoid or somewhat obovoid, small; otherwise as *C. Mannii* and *C. Deckenii*.—A. Rich. Tent. Fl. Abyss. ii. 488; Boeck. in Linnæa, xxxv. 582; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 562; K. Schum. in Engl. Pfl. Ost-Afr. C. 120; Engl. Hochgebirgsfl. Trop. Afr. 140; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 103.

Nile Land. Abyssinia: Mount Scholoda, *Schimper*, 348! Debra Eski, 8250 ft., *Schimper*, 160! Amman Eski, 6800 ft., *Schimper*, 533! and without precise locality, *Schimper*, 261! 1481! *Parkyns!* British East Africa: Butagu in Ruwenzori district, *Scott-Elliot*, 7979!

Mozamb. Dist. British Central Africa: Nyasaland; in damp places on the Nyika Mountains, 6000–7000 ft., *Whyte!* Zomba Rock, *Whyte!*

The diagnosis above given is drawn from Schimper, 348. With this, Scott-Elliot, 7779, closely agrees. The southern Nyasaland examples of Whyte have the spikelets rather smaller, the glumes smaller and closer together on the rhachilla.

55. **C. derreilema,** *Steud. in Flora*, 1842, 585. Tall, robust. Umbel 4–7 in. in diam., dense with innumerable heads, red. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{10}$ in. (i.e., larger than in *C. fischerianus*), moderately compressed, somewhat turgid, soft. Glumes rather close together on the rhachilla, not rigid nor mucronate; otherwise as *C. fischerianus*.—Steud. Syn. Pl. Glum. ii. 20; A. Rich. Tent. Fl. Abyss. ii. 488; Boeck. in Linnæa, xxxv. 583; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 556; Engl. Hochgebirgsfl. Trop. Afr. 141.

Nile Land. Abyssinia: in the middle region of Mount Silke, *Schimper*, 659! and without precise locality, *Schimper*, 534! British East Africa: Ruwenzori, 10,000 ft., in the bamboo forest, *Scott-Elliot*, 7731!

This species again is exceedingly near the preceding; and the difficulty of diagnosing it is not lessened by the fact that in Schimper, 659 (the type of authors), the spikelets have been attacked by smut, and no good nut is to be seen.

56. **C. Ajax,** *C B. Clarke.* Glabrous. Top of the stem stout, triquetrous. Umbel 10–12 in. in diam., decompound; rays and raylets numerous, stout; bracts overtopping the umbel, $\frac{3}{4}$–1 in. broad, 3-nerved. Spikes 200–400 to the umbel, red-brown, of 3–5 spikelets each. Spikelets $\frac{1}{4}$ by $\frac{1}{8}$ in., compressed, 6–10-flowered. Glumes ovate, with a small mucro. Nut $\frac{2}{3}$ the length of the glume, ovoid, at the base and apex pyramidal. Otherwise as *C. derreilema*.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Zomba, 4000–6000 ft., *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!*

The two collections of this each show the umbel only with the bracts cut down. It differs from *C. derreilema* in the shorter, broader, more compressed spikelets as well as in the very broad bracts.

57. **C. diffusus,** *Vahl, Enum.* ii. 321. Glabrous. Stolons 0; roots wiry. Stem 1–2 ft. long, triquetrous at the top. Leaves often numerous, as long as the stem, $\frac{1}{4}$–$\frac{1}{2}$ in. broad, 3-nerved. Umbel 4–10 in. in diam., usually compound or decompound, rather dense, green; bracts 5–8, long, overtopping the umbel, similar to the leaves. Spikes digitate, of 3–9 spikelets. Spikelets $\frac{1}{4}$–$\frac{1}{2}$ by $\frac{1}{8}$ in., 4–14-flowered, compressed. Glumes ovate, acutely keeled, grey-green, strongly 7–11-nerved, with a recurved conspicuous mucro, in fruit squarrose (being forced outwards by the large nut). Style short; branches 3, linear, long. Nut large, nearly as long as the glume (excluding its mucro), broadly ellipsoid, trigonous, smooth, dusky black.—Kunth, Enum. ii. 30; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 603, and in Durand & Schinz, Conspect. Fl. Afr. v. 557; Durand & Schinz, Études, Fl. Congo, i. 286; Urban, Symb. Antill. ii. 30; Rendle in Cat. Afr. Pl. Welw. ii. 113. *C. elegans*, Swartz, Obs. Bot. 30; Kunth, Enum. ii. 28; Benth. in Hook. Niger Fl. 549; Boeck. in Linnæa, xxxv. 532; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 135;

not of Linn. *C. sylvestris*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 134; Rendle in Cat. Afr. Pl. Welw. ii. 112. *C. Buchholzii*, Boeck. Cyp. Novæ, i. 3. *C. Buettneri*, Boeck. Cyp. Novæ, i. 3, and in Verhandl. Bot. Ver. Brandenb. xxxi. 71.

Upper Guinea. Gold Coast: Aburi, *Johnson!* Lagos: near Addo, *Millen*, 182! Old Calabar, *Holland*, 101! Cameroons: Efulen, *Bates*, 283! Ebea (Edea?) Falls, *Dinklage*, 640! Yaunde, *Zenker & Staudt*, 798! and without precise locality, *Preuss*, 92! 348! *Miss Kingsley! Buchholz! Braun*, 26! Fernando Po, *Vogel!*

Lower Guinea. Princes Island, *Mann! Newton!* Spanish Gaboon: Mount John, Kongui River, *Mann*, 1895! Gaboon: Sibange, *Buettner*, 9! Lower Congo, *Hens*, 356! Angola: Pungo Andongo; in marshy places, *Welwitsch*, 6942! 6943! 6944! 6898! Golungo Alto; banks of streams on the mountains of Alto Queta, *Welwitsch*, 7071!

Common throughout the tropics, including Madagascar, but no specimen from East Africa.

N.B. No part of *C. elegans*, Linn., neither description nor herbarium examples, refers to this species.

58. **C. glaucophyllus,** *Boeck. Cyp. Novæ*, i. 4. Glabrous. Rhizome oblique. Stem nearly 3 ft. long, at the top trigonous. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{4}$ in. broad. Umbel 10 in. in diam., compound, with slender flexuose rays; bracts overtopping the umbel, similar to the leaves. Spikelets 6–1 together, $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{16}$–$\frac{1}{12}$ in., brown, compressed, 12–16-flowered. Glumes striate, minutely mucronate. Style nearly as long as the nut; branches 3, linear. Nut $\frac{1}{3}$ as long as the glume, oblong-obovoid, black.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 564; K. Schum. in Engl. Pfl. Ost-Afr. C. 120.

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 24!

The spikelets are said by Boeckeler to be solitary; so some of them are, as is very commonly the case in the group of *C. diffusus*; but the ultimate inflorescence is not spicate (as in the subgenus *Choristachyæ*); the final umbellule has some of its raylets with one spikelet only.

59. **C. Baroni,** *C. B. Clarke in Journ. Linn. Soc.* xx. 289. Stem up to 3 ft. high, at the top trigonous. Leaves $\frac{3}{4}$ the length of the stem, up to $\frac{1}{2}$ in. broad, somewhat 3-nerved. Umbel decompound, 8–14 in. in diam., with innumerable spikes; bracts overtopping the umbel, similar to the leaves. Spikelets 3–5 together, $\frac{1}{5}$–$\frac{1}{4}$ by $\frac{1}{16}$ in., compressed, brown, 6–12-flowered. Glume ovate, green, 5-nerved on the back, usually very minutely pubescent near the excurrent mucro. Nut $\frac{1}{2}$–$\frac{3}{5}$ the length of the glume, small, ellipsoid. Style short; branches 3, longish.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 550. *C. Mannii*, K. Schum. in Holst, Exsicc. 3385.

Mozamb. Dist. German East Africa: Usambara; Lutindi, *Holst*, 3385 British Central Africa: Nyasaland; Kondowe to Karonga, 2000–6000 ft., *Whyte!* and without precise locality, *Buchanan*, 647!

Common in Madagascar.

This species differs from *C. Deckenii* by the smaller spikelets. Buchanan, 647, and Whyte's example are identical with the typical *C. Baroni* from Madagascar. As to Holst, 3385, it is nearer *C. Deckenii* than *C. Mannii*, but the bracts attain $\frac{1}{24}$ in. in width, so that it does not exactly match anything else; the spikelets are too long with too distant glumes to match *C. Ajax*.

60. **C. zambesiensis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 581. Stem exceeding $4\frac{1}{2}$ ft. long, stout, at the top triquetrous. Leaves 3 ft. by $\frac{1}{2}$–$\frac{3}{4}$ in., 3-nerved. Umbel decompound, rays 9 in. long; secondary rays slender, flexuose, with innumerable brown spikes. Spikelets 2–5 together, $\frac{1}{4}$ by $\frac{1}{16}$ in., compressed, delicate, 10–12-flowered, comose from the red-brown stigmas. Glumes ovate, apiculate, hardly mucronate. Style short; branches 3, linear, long. Nut scarcely $\frac{1}{2}$ the length of the glume, ovoid, trigonous.

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 47!

This was marked by Boeckeler *C. longifolius*, Poiret, which has much larger spikelets and nuts and is near *C. diffusus*, Vahl. It is near the large examples of *C. Baroni*, but the slender branchlets of the umbel and delicate spikelets give it a different aspect. Whyte's Mlanji plant, which I formerly referred here, I have above renamed *C. Deckenii*.

61. **C. Renschii,** *Boeck. in Flora*, 1882, 11. Glabrous. Rhizome horizontal. Stem attaining 6 ft. high, very stout, at the top triquetrous or almost 3-winged. Leaves up to 4 ft. by $1\frac{1}{8}$ in., 3-nerved. Umbel 8–24 in. in. diam., decompound in a rigid somewhat divaricate manner; bracts 2 ft. by $\frac{7}{8}$ in., similar to the leaves. Spikes innumerable, green, finally brown-red, exceedingly small, of 2–7 clustered spikelets. Spikelets $\frac{1}{12}$–$\frac{1}{5}$ in. long, hardly compressed, oblong or ovoid, 3–6-flowered. Glumes ovate, distichous, keel minutely excurrent into a mucro. Stamens 3–2; anthers small, oblong, muticous. Undivided part of the style $\frac{1}{2}$ the length of the nut; branches 3, as long as the nut. Nut $\frac{1}{2}$–$\frac{2}{3}$ the length of the glume, obovoid, smooth, brown; apex pyramidal.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 573; Rendle in Cat. Afr. Pl. Welw. ii. 113. *C. hylæus*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 134. *C. sylvicola*, Ridley in Bolet. Soc. Brot. v. 208, t. F, fig. A. *C. deremensis*, K. Schum. in Engl. Pfl. Ost-Afr. C. 119. *C. ochrocarpus*, K. Schum. in Engl. Pfl. Ost-Afr. C. 122. *Scirpus trialatus*, Boeck. in Flora, 1879, 563.

Upper Guinea. Gold Coast; Kwahu, 2000 ft., *Johnson*, 689! and without precise locality, *Burton & Cameron!* Cameroons: Cameroon Mountain, 2000–3000 ft., *Mann*, 2103!

Nile Land. British East Africa: Niamniam, *Schweinfurth*, 3109! Rabai Hills, near Mombasa, *Taylor!*

Lower Guinea. Island of St. Thomas, 4000–6000 ft., *Quintas*, 10! and in *Fl. Afr. Exsicc. Conimbric.*, 116! *Moller in Fl. Afr. Exsicc. Conimbric.*, 117! Lower Congo: Kisantu, *Gillet*, 574! Angola: Golungo Alto; by streams, *Welwitsch*, 6843!

South Central. Lunda: Mukenge, *Pogge*, 1588! 1599! Congo Free State: Lualaba River, *Pogge*, 1589!

Mozamb. Dist. German East Africa: Kilimanjaro, 5000 ft., *Volkens*, 903! Usambara; Nderema, *Holst*, 2257!

Also in the Comoro Islands.

This species is well separated from the preceding by its huge size and very small few-flowered spikelets. As to the synonymy cited, I have seen authenticated examples of the seven names.

62. **C. aureobruneus,** *C. B. Clarke*. Glabrous. Top of the stem $\frac{1}{6}$ in. in diam., triquetrous. Umbel 8 in. in diam., decompound, dense with numerous golden-brown spikes; bracts 3–5, suberect, lowest $\frac{1}{4}$ in. broad, usually much shorter than the umbel, but in one case a little overtopping the umbel. Spikelets 5–12 together, $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{12}$ in., compressed, 14–30-flowered, with parallel sides. Glumes elliptic, somewhat 3-nerved, rounded at the top, with narrow scarious torn margin. Style short; branches 3, hardly exserted. Nut small, $\frac{1}{3}$ length of the glume, ellipsoid, trigonous, brown (many white and infertile).

Mozamb. Dist. British Central Africa: Nyasaland; Tanganyika Plateau, at Fort Hill, 3500–4000 ft., *Whyte!*

The collection consists of 5 fine umbels. The species does not resemble any one in this group, and is perhaps really allied to *C. amabilis*, Vahl, though of very large size.

63. **C. Iria,** *Linn. Sp. Pl. ed.* 2, 67, *excl. tab. Rheed. cit.* Annual, glabrous. Stems 4–20 in. long, tufted. Leaves often nearly as long as the stem, $\frac{1}{5}$ in. broad. Umbel 2–20 in. in diam., usually compound; bracts long, often overtopping the umbel, similar to the leaves. Spikes of 5–20 spikelets loosely spicate on a rhachis $\frac{1}{3}$–2 in. long. Spikelets $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{12}$ in., yellow or brown, 6–20-flowered; rhachilla not winged. Glumes obovate, muticous, in fruit hardly imbricated. Nut nearly as long as the glume, triquetrous, black; style short, branches 3, shortly exserted.—Kunth, Enum. ii. 38; A. Rich. Tent. Fl. Abyss. ii. 482; Boeck. in Linnæa, xxxv. 595, and in Flora, 1879, 551; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 606, and in Durand & Schinz, Conspect. Fl. Afr. v. 565. *C. resinosus*, Hochst. ex Steud. Syn. Pl. Glum. ii. 23.

Upper Guinea. Senegambia: Galam, *Heudelot*, 314! 329! and without precise locality, *Heudelot*, 312!

Nile Land. Nubia, *Kotschy*, 52! Kordofan: near Obeid, *Kotschy*, 267! Darfur: Gebel Barkin, *Pfund*, 335! 624! 636! British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2281!

Also in Mauritius, Persia and Cabul. A rice-field pest in South and East Asia Malaya and Australia.

64. **C. sphacelatus,** *Rottb. Descr. et Ic.* 26. Annual, glabrous. Stems 6–24 in. long, rather slender, tufted. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{8}$–$\frac{1}{5}$ in. broad. Umbel compound or simple, open; bracts 3–6, similar to the leaves, lowest often overtopping the umbel. Spikes of 5–12 spikelets. Spikelets $\frac{1}{2}$–1 by $\frac{1}{16}$–$\frac{1}{12}$ in., much flattened, 8–24-flowered, straw-coloured, often purple-spotted. Glumes obtuse,

often with a purple spot on each side; rhachilla with oblong wings. Style shorter than the nut; branches 3, linear, hardly exserted. Nut ½ the length of the glume, ellipsoid or obovoid, trigonous, ashy-black.—Schumach. Beskr. Guin. Pl. 37; Kunth, Enum. ii. 63; Benth. in Hook. Niger Fl. 550; Boeck. in Linnæa, xxxvi. 292; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 139 partly; C. B. Clarke in Journ. Linn. Soc. xxi. 183, and in Durand & Schinz, Conspect. Fl. Afr. v. 577; Henriques in Bolet. Soc. Brot. v. 208; De Wild. & Durand in Comptes-rendus Soc. bot. Belg. xxxvi. 89; K. Schum. in Engl. Pfl. Ost-Afr. C. 120; Durand & Schinz, Études Fl. Congo, i. 293; Urban, Symb. Antill. ii. 30; Rendle in Cat. Afr. Pl. Welw. ii. 117. *C. pustulatus*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 128 partly.

Upper Guinea. Sierra Leone, *Don! Vogel*, 33! *Welwitsch*, 7056. Liberia: Grand Bassa, *Ansell!* Gold Coast: Cape Coast Castle, *Don!* Dahomey, *Newton*, 27! River Niger; at Attah, *Vogel!* Lokaja district, *Richardson*, 1! and without precise locality, *Baikie!* Old Calabar, *Robb*! Fernando Po, *Barter! Vogel*, 13!

Lower Guinea. Island of St. Thomas, up to 2800 ft., *Moller in Flor. Afr. Exsicc. Conimbric.*, 120! Annobon Island, *Burton!* Gaboon: Munda; Sibange Farm, *Soyaux*, 325A! Lower Congo: Lutete and Stanley Pool, 1000 ft., *Hens*, B, 22! 41! 99! 267! Leopoldville, *Luja*, 12! Angola: Loanda, *Welwitsch*, 7102 partly! Golungo Alto; at the foot of Mount Cungulungulo, *Welwitsch*, 7070! near Rodrigo's house, rare, *Welwitsch*, 7090!

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; Tete, *Kirk!*

Var. *tenuior*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 577. Spikelets 1–4, subdigitate on the rays of a simple umbel, about 10-flowered.

Upper Guinea. Senegambia, *Heudelot*, 485!

This much resembles the slender African form of *C. Zollingeri*; but it appears annual, and the bracts are larger and more flaccid than those of *C. Zollingeri*.

65. **C. compressus,** *Linn. Sp. Pl.* 46. Annual, glabrous, green. Stems 4–16 in. long, tufted. Leaves often ⅔ the length of the stem, ⅛ (rarely ⅕) in. broad. Umbel simple (or appearing nearly so), straggling; lowest bract usually longer than the umbel, similar to the leaves. Spikelets 3–10 together, shortly spicate, or almost clustered, ½–1 by ⅙–¼ in., very much compressed, green or when ripe yellowish, 4–40-flowered. Glumes ovate, conspicuously many-striate, closely packed, keel very sharp and shortly excurrent into a mucro. Nut ⅓ the length of the glume, broadly obovoid, very acutely triquetrous (so that the faces are concave), black. Style shorter than the nut; branches 3, hardly exserted.—Kunth, Enum. ii. 23; Boeck. in Linnæa, xxxv. 517; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 605, and in Durand & Schinz, Conspect. Fl. Afr. v. 553; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 132; K. Schum. in Engl. Pfl. Ost-Afr. C. 118; Urban, Symb. Antill. ii. 31; Rendle in Cat. Afr. Pl. Welw. ii. 111.

Upper Guinea. Senegal, *Leprieur*, 4! Sierra Leone: at the foot of Sugar Loaf Mountain, *Welwitsch*, 7057! Old Calabar, *Robb!*

Nile Land. British East Africa: Mombasa; *Taylor!*

Lower Guinea. Angola: Loando; near Cabo Lombo, *Welwitsch*, 7021! 7045! ponds near Cumano, *Welwitsch*, 7026! Mossamedes; damp places at the public garden, near Mossamedes, *Welwitsch*, 6884!

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1072! *Schmidt*, 64! German East Africa: Zanguebar, *Kirk!* Usambara; Amboni, *Holst*, 2583! Portuguese East Africa: Quilimane, *Zimmermann!* Zambesi Delta; Luabo River, *Kirk!* British Central Africa: Boruma, on the Zambesi, *Menyharth*, 583!

And in nearly all tropical and subtropical countries.

66. **C. incompressus,** *C. B. Clarke*. Annual, glabrous. Stems 12–18 in. long, tufted, triquetrous, almost 3-winged. Leaves $\frac{1}{2}$ the length of the stem, $\frac{1}{5}$ in. broad. Umbel in appearance simple, of 3–5 very unequal rays, lower up to 8 in. long; bracts 3–4, similar to the leaves, lowest about as long as the umbel. Spikelets 3–5 together, shortly spicate, up to 1 by $\frac{1}{4}$ in., moderately flattened, 16–24-flowered, pallid, tinged with rose. Glumes concave, obtuse, obscurely keeled, somewhat inflated, 3-nerved on the back; rhachilla not winged. Stamens 3; anthers shortly oblong. Nut $\frac{1}{3}$ the length of the glume, obovoid, acutely triquetrous; style shorter than the nut; branches 3, little exserted.

Upper Guinea. Sierra Leone: in swamps near Kambia, on the River Scarcies, *Scott-Elliot*, 4373!

This has been distributed as *C. compressus*, Linn.; the obtuse round-backed glumes are very different.

67. **C. aristatus,** *Rottb. Descr. et Ic.* 23, *t.* 6, *fig.* 1. Annual, glabrous. Stems 1–7 in. long, tufted. Leaves often as long as the stem, $\frac{1}{12}$ in. broad. Umbel appearing simple (or of 1 spike); rays 1–6, up to 3 in. long; bracts similar to the leaves, lowest usually overtopping the umbel. Spikes $\frac{1}{2}$ by $\frac{1}{3}$ in., cylindric or subovoid, dense, of 5–40 spikelets, finally brown, spreading. Spikelets $\frac{1}{2}$ by $\frac{1}{6}$ in. (or usually smaller), compressed, 6–30-flowered; rhachilla not winged. Glumes ovate-lanceolate, 7–9-striate over nearly their whole breadth, keel excurrent into a conspicuous recurved bristle. Stamen 1. Nut $\frac{1}{3}$ the length of the glume (mucro included), oblong or narrowly obovoid, dusky brown; style shorter than the nut; branches 3, shortly exserted. —Schumach. Beskr. Guin. Pl. 39; Kunth, Enum. ii. 23; Steud. in Flora, 1842, 585; A. Rich. Tent. Fl. Abyss. ii. 478; Benth. in Hook. Niger Fl. 549; Boeck. in Linnæa, xxxv. 500, and in Flora, 1879, 548 (excl. the syn. *C. hamulosus*, M. Bieb.); T. Thoms. in Speke, Nile, Append. 653; Oliver in Trans. Linn. Soc. xxix. 164; Schweinf. Beitr. Fl. Aethiop. 215; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 130; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 606, in Durand & Schinz, Conspect. Fl. Afr. v. 548, in Bull. Herb. Boiss. iv. Append. iii. 29, and in Dyer, Fl. Cap. vii. 179; Schweinf. in Bull. Herb. Boiss. ii. Append ii. 46; Ficalho & Hiern in Trans. Linn. Soc. ser. 2, Bot. ii. 26; K. Schum. in Engl. Pfl. Ost-Afr. C. 118; Rendle in Cat. Afr. Pl. Welw. ii. 110. *C. squarrosus*, Linn. Amœn. Acad. iv. 303, and Sp. Pl. ed. 2, 66 partly. *Dichostylis aristata*, Palla in Engl. Jahrb. x. 296

Upper Guinea. Senegal: in damp places in the Wallo district, *Roger*, 68! and without precise locality, *Leprieur*, 3! Senegambia: Galam, *Heudelot*, 128! and without precise locality, *Heudelot*, 328! Gambia, *Mungo Park!* Gold Coast: Accra, *Vogel*, 13! Niger Territory: Nupe, *Barter*, 1570!

Nile Land. Kordofan: around ponds, *Kotschy*, 50! *Steudner*, 909! Eritrea! Gaaba, in a lava valley, *Schweinfurth*, 1670! Abyssinia: near Gapdia, *Schimper*, 822! near Gafta, *Schimper*, 1208! Tacazze Valley, *Schimper*, 1735! Goelleb, *Schimper*, 2155! and without precise locality, *Schimper*, 217! 437! 855! *Hildebrandt*, 365! 366! British East Africa: Kich district, at Ador Village, *Petherick!* Jur; Jur Ghattas, *Schweinfurth*, 1984! ser. iii. 192! Kamasia, *Gregory*, 63! Kikumbuliyu; Ngomene, *Scott-Elliot*, 6227!

Lower Guinea. Angola; Loanda, 1000 ft., *Welwitsch*, 7029! 7031! 7078! Benguela, *Welwitsch*, 6894! Pungo Andongo, 3500 ft., *Welwitsch*, 6909! 6909B! Huilla, 5000 ft., *Welwitsch*, 6895! Namaqualand, *Schinz*, 388! Damnaraland, *Een!*

Mozamb. Dist. Zanzibar, *Taylor!* German East Africa: Unyamwezi; Kezeh (Tabora), *Speke & Grant!* Kowanda, *Fischer*, 634! and without precise locality, *Stuhlmann*, 3467! Portuguese East Africa: Lower Zambesi; Tete, *Kirk!* British East Africa: Nyasaland; Namasi, *Cameron*, 12! and without precise locality, *Buchanan*, 624A! Rhodesia; Tamasetze, *Holub!* Mapani Pan, *Holub!* Gashuma Flats, *Holub!* Boruma, on the Zambesi, *Menyharth!*

Also in India, Australia, and nearly the whole of America.

This species has been greatly confused with *C. uncinatus*, Poiret, probably by reason of noticing the recurved points of the glumes instead of the more important characters.

68. **C. distans,** *Linn. f. Suppl.* 103. Glabrous, large or medium sized. Stolons elongate, hardening into a stout horizontal rhizome, but many plants flower the first year. Stems 1–3 ft. long. Leaves often as long (or $\frac{2}{3}$ as long) as the stem, $\frac{1}{4}$–$\frac{1}{3}$ in. broad. Umbel compound, usually open 8–12 in. in diam., sometimes congested or depauperated; bracts usually overtopping the umbel, similar to the leaves. Spikelets usually spicate (rhachis of the spike $\frac{1}{3}$–2 in. long), $\frac{1}{2}$–$1\frac{1}{2}$ by $\frac{1}{24}$ in., almost acicular, reddish, 10–12-flowered, in fruit divaricate at right angles; rhachilla very slender, not winged, appearing zigzag in the lower half where the glumes have fallen. Glumes very remote, oblong-elliptic, obtuse. Nut $\frac{1}{2}$–$\frac{3}{5}$ the length of the glume, oblong or narrow-ellipsoid, trigonous, dusky-black, style much shorter than the nut; branches 3, shortly exserted.—Beauv. Fl. Owar. i. 35, t. 20; Kunth, Enum. ii. 93; Benth. in Hook. Niger Fl. 551; Boeck. in Linnæa, xxxv. 612; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 607, in Durand & Schinz, Conspect. Fl. Afr. v. 558, and in Dyer, Fl. Cap. vii. 178; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 138 partly; Henriques in Bolet. Soc. Brot. v. 208; K. Schum. in Engl. Pfl. Ost-Afr. C. 120, excl. var. β; Engl. Hochgebirgsfl. Trop. Afr. 142; Durand & Schinz, Études Fl. Congo, i. 286; De Wild. & Durand in Comptes-rendus Soc. bot. Belg. xxxvi. 88; Urban, Symb. Antill. ii. 32; Rendle in Cat. Afr. Pl. Welw. ii. 116. *C. elatus*, Presl in Oken, Isis, xxi. 271; Boeck. in Flora, 1879, 551, not of Linn. *C. squamulatus*, Steud. Syn. Pl. Glum. ii. 49. *C. dissolutus*, Boeck. in Flora, 1879, 555, not of H. B. & K.

Upper Guinea. Senegambia, *Heudelot*, 688! 788! Sierra Leone, *Afzelius! Don!* Gold Coast, *Burton & Cameron!* Cameroons: Bipidde, *Zenker*, 899! and without precise locality, *Braun*, 16! 24! Fernando Po, *Vogel*, 218! *Mann*, 121!

Nile Land. Abyssinia: Begemeder; Senka Ber, 4200 ft., *Schimper*, 1552! and without precise locality, *Schimper*, 176! British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2314! Niamniam; at Nabambisso River, *Schweinfurth*, 3023! Ruwenzori, 6000 ft., *Scott-Elliot*, 7590! Lake Losuguta, *Gregory*, 51! Ukamba; Kitui, *Hildebrandt*, 2656! near Mombasa, *Taylor!*

Lower Guinea. Island of St. Thomas, *Don! Moller in Fl. Afr. Exsicc. Conimbric.*, 118! Princes Island, *Welwitsch*, 7033B! Gaboon: Munda: Sibange Farm, *Soyaux*, 326! Lower Congo: River Ntombe, near Lutete, 1500–1800 ft., *Hens*, A, 86! 255! 259! Kisantu, *Gillet*, 671! Angola: Ambaca; at Lake Canguele-Canganga, *Welwitsch*, 7095! Loanda; *Welwitsch*, 7047! 7048! 7054! Benguela, *Menyharth*, 202!

South Central. Congo Free State: Monbuttu; Munza, *Schweinfurth*, 3506! Bangala, *Demeuse*, 339! Nyangwe, *Pogge*, 2582! Casselange, *Pogge*, 1580! River Lukassi, *Pogge*, 1570! 1571! 1572! 1573! Albertville (Tanganyika Region), *Huy!*

Mozamb. Dist. Zanzibar, *Kirk! Schmidt*, 66! German East Africa: Usambara; Amboni, *Holst*, 2764! Nderema, 2500 ft., *Volkens*, 123! Karagwe; Bukoba, *Stuhlmann*, 3728! Kavala Islands in Lake Tanganyika, *Carson*, 1! Portuguese East Africa: Zambesi, *Stewart!* British Central Africa: Nyasaland! Kondowe to Karonga, 2000–6000 ft., *Whyte!* near Umbaku River, *Scott!* between Matope and Lake Pamelombe, *Scott!* Zomba, 2800 ft., *Whyte!* Masuka Plateau, 6500 ft., *Whyte!* Shire Highlands, *Buchanan*, 50! *Scott-Elliot*, 8593!

Also in South Africa, the Mascarene Islands, and in nearly all warm regions.

Var. *niger*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 559. Spikelets black-chestnut-coloured.

Nile Land. Abyssinia, *Schimper*, 1255!

Mozamb. Dist. British Central Africa: Urungu, Fwambo, *Carson*, 14!

69. **C. nutans,** *Vahl, Enum.* ii. 363. Spikes long, rhachis often 1–1½ in. long. Spikelets ¼–¾ by ⅛ in., suberect, brown when dry. Glumes approximate, but in fruit hardly imbricated; otherwise as *C. distans*, Linn. f.—Kunth, Enum. ii. 94; Boeck. in Linnæa, xxxv. 597; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 607, and in Durand & Schinz, Conspect. Fl. Afr. v. 570; Rendle in Cat. Afr. Pl. Welw. ii. 116. *C. Jacquini*, Fenzl in Denksch. Akad. Wissen. Wien, viii. 45, t. 1. *C. eleusinoides*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 137; Rendle in Cat. Afr. Pl. Welw. ii. 116.

Lower Guinea. Angola; Pungo Andongo; banks of the River Lombe, 3500 ft., *Welwitsch*, 6935! banks of the stream near Quilanga, *Welwitsch*, 6941!

Frequent in India and China.

The spikelets being suberect in fruit, the spikes are in the typical plant 1¼ by ¼ in., while in *C. distans*, Linn. f. (with divaricate spikelets) they are 1–2 in. broad. The spikes are longer than those of *C. eleusinoides*, and the glumes not (or obscurely) mucronate; otherwise the two are very closely allied.

70. **C. eleusinoides,** *Kunth, Enum.* ii. 39. Stems 1–3 ft. long, throwing out lateral shoots at the base; no elongate stolons seen. Spikes about 1 by ⅓ in., dense, cylindric, with obliquely spreading green or grey-brown spikelets. Spikelets ½ by ⅛ in., about 10-flowered. Glumes

mucronate, approximate, in fruit spreading, but little imbricated. Nut often curved; otherwise as *C. distans*.—Boeck. in Linnæa, xxxv. 596; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 608, and in Durand & Schinz, Conspect. Fl. Afr. v. 559; Engl. Hochgebirgsfl. Trop. Afr. 141; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 48. *C. xanthopus*, Steud. in Flora, 1842, 595; A. Rich. Tent. Fl. Abyss. ii. 485. *C. kotschyanus*, Fenzl ex Steudel, Syn. Pl. Glum. ii. 36.

Nile Land. Upper Sennar: Fazokl, *Kotschy*, 528! Galabat: region of Matamma, *Schweinfurth*, 2005! 2006! Abyssinia: Modat; by streams in Augar Valley, *Schimper*, 1021! near Demerki, 1155!

Also in the Orient, India, China, Malaya and Queensland.

71. **C. latifolius,** *Poir. in Lam. Encycl.* vii. 268. Glabrous. Stolons long, $\frac{1}{8}$–$\frac{1}{6}$ in. thick. Stem 2–3 ft. long, at the top acutely triquetrous. Leaves $\frac{3}{4}$ the length of the stem, $\frac{3}{4}$ in. broad. Umbel compound, dense; secondary umbels pyramidal, corymbose; bracts overtopping the umbel, similar to the leaves. Spikes of 4–8 spikelets; rhachis glabrous or scarcely hairy. Spikelets $\frac{1}{2}$ by $\frac{1}{8}$ in., moderately compressed, pallid or reddish, 8–16-flowered. Glumes imbricated even in fruit, obtuse. Nut $\frac{1}{2}$ the length of the glume, obovoid, trigonous, black.—Kunth, Enum. ii. 75; Boeck. in Linnæa, xxxv. 602; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 565, and in Dyer, Fl. Cap. vii. 177; K. Schum. in Engl. Pfl. Ost-Afr. C. 120.

Nile Land. British East Africa: Nandi Range, north of Victoria Nyanza, 6500 ft., *Scott-Elliot*, 6905!

South Central. Angola: Malange, *Buchner!*

Mozamb. Dist. Portuguese East Africa: East coast of Lake Nyasa, *Johnston*, 6! British East Africa: Nyasaland; Zomba Plains, 2500–3000 ft., *Whyte!* Mount Zomba, 4000–6000 ft., *Whyte!*

Also in South Africa and the Mascarene Islands.

72. **C. socialis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 577. Glabrous, leafless. Rhizome horizontal, thick. Stem 3 ft. long, stout, at the top acutely triquetrous. Umbel compound, contracted, dense; bracts several, the lowest 16 by $\frac{1}{2}$ in. Spikelets up to 30 in the cylindric spikes, spreading, $\frac{1}{6}$ by $\frac{1}{16}$ in., a little compressed, 8–10-flowered; rhachilla very narrowly winged. Glumes rather remote, dusky, obtuse. Style 3-fid. Nut $\frac{1}{2}$ the length of the glume, oblong-obovoid, black.—Rendle in Cat. Afr. Pl. Welw. ii. 118. *C. latifolius*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 138, not of Poiret.

Lower Guinea. Angola: Cazengo; at the Lake of Moembege, not plentiful, *Welwitsch*, 7068!

The spikes and the spikelets resemble those of *C. pilosus*, Vahl; but the rhachis of the spike is quite glabrous.

73. **C. pilosus,** *Vahl, Enum.* ii. 354. Glabrous, except the rhachis of the spikes. Stolons slender, finally hardening into rhizomes. Stem 1–2$\frac{1}{2}$ ft. long, at the top acutely triquetrous. Leaves $\frac{3}{4}$ the length of the stem, $\frac{1}{6}$–$\frac{1}{3}$ in. broad. Umbel usually compound; rhachis of the

spikes minutely hairy; bracts several, similar to the leaves, the lowest overtopping the umbel. Spikelets spicate, divaricate at right angles, $\frac{1}{2}$–$\frac{2}{3}$ by $\frac{1}{12}$ in., pale reddish, compressed, 10–24-flowered; rhachilla scarcely winged. Glumes ovate, obtuse, rather loosely imbricated. Nut $\frac{3}{5}$ the length of the glume, ellipsoid, acutely trigonous, black.—Kunth, Enum. ii. 80; Boeck. in Linnæa, xxxv. 598, and in Flora, 1879, 551; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 609, and in Durand & Schinz, Conspect. Fl. Afr. v. 571. *C. marginellus*, Nees in Wight, Contrib. 83; Kunth, Enum. ii. 75.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2017!

Abundant in India; extending to Japan, Malaya and Queensland.

Schweinfurth's plant has the rhachis of the spikes only minutely hairy, and thus agrees with the form "*marginella*" (sp.) Nees. The examples are young and perhaps should be sorted rather with *C. procerus*, Rottb. var. *lasiorrhachis* (Hook. f. Fl. Brit. Ind. vi. 610); Boeckeler considers that no specific line can be drawn between this and *C. pilosus*.

74. **C. pratensis,** *Boeck. in Linnæa*, xxxviii. 364. Glabrous. Rhizome short, horizontal, knotty. Stems 1 ft. long, at the top triquetrous and slender, at the base bulbous, approximate. Leaves $\frac{1}{2}$–$\frac{2}{3}$ the length of the stem, $\frac{1}{8}$ in. broad. Umbel of 1–4 rays, contracted into a compound head; bracts 3, lowest suberect, $3\frac{1}{2}$ in. long, similar to the leaves. Spikelets in a dense oblong spike, $\frac{1}{4}$–$\frac{1}{3}$ in. long, linear-lanceolate, 8–10-flowered, obliquely suberect, rigid, somewhat shining, variegated with brown. Glumes ovate, very obtuse, rounded on the back, strongly 5-nerved. Style short; branches 3, long, somewhat exserted. Nut $\frac{3}{4}$ the length of the glume, broadly ellipsoid.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. 572; Engl. Hochgebirgsfl. Trop. Afr. 141.

Nile Land. Abyssinia: Begemeder; near Dewr (Debra) Ari, 8500 ft., *Schimper*, 1326!

This remarkable species appears not closely allied to any other Old World species; but much resembles the North American group of *Cyperus*, of which *C. Schweinitzii*, Torrey, is the best-known representative. They form that section of *Cyperus* which is nearest to and much confused with *Mariscus* (the *C. Manimæ*, H. B. & K. group); and the nodose rhizome is also very similar.

Var. *radiatus*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 572. Rays of umbel 3–5, up to $1\frac{1}{2}$ in. long. Spikes cylindric, dense $\frac{2}{3}$ by $\frac{1}{4}$ in.

Nile Land. Abyssinia: Begemeder; near Gafat, 8800 ft., *Schimper*, 1330!

Var. *laxa*, C. B. Clarke. Rays of umbel 3–5, up to 1–2 in. long. Spikes of 4–7 spikelets placed $\frac{1}{8}$ in. apart, very lax.

Lower Guinea. Lower Congo; Kimuenza, *Gillet*, 1744!

This might be treated as a separate species, the general aspect of the inflorescence being very unlike that of *C. pratensis*. But the resemblance of the spikelets, glumes, styles and nuts is so complete that it must be very closely allied.

75. **C. bulbosus,** *Vahl, Enum.* ii. 342. Glabrous. Stolons very slender, with yellow or brownish scales, disappearing as soon as the bulbs are completely formed; bulbs formed close to the end of the stolon, when ripe ovoid, $\frac{2}{5}$ by $\frac{1}{5}$ in., enclosed in a hard black striate coat which splits irregularly into lanceolate valves. Stems annual,

arising from a bulb, 4–12 in. long, very slender. Leaves numerous, longer than the stem, at the base $\frac{1}{6}$ in. broad, but the upper half very narrow and whip-like. Umbel contracted (rays usually not exceeding $\frac{1}{4}$–$\frac{1}{2}$ in. long), irregular subcorymbose (i.e. the lowest ray often $\frac{1}{8}$–$\frac{3}{8}$ in. below the others); bracts 3–6, lower much exceeding the umbel, with whip-like ends as the leaves. Spikelets 4–12 in a spike, rather loosely spicate, $\frac{1}{2}$ by $\frac{1}{12}$–$\frac{1}{10}$ in., compressed, red, 8–26-flowered; rhachilla winged; glumes boat-shaped, obtuse, 11-striate, reddish. Nut $\frac{1}{2}$ the length of the glume, persistent, obovoid, black; style short; branches 3, long, exserted.—Steud. in Flora, 1842, 594; Boeck. in Linnæa, xxxvi. 300, and in Flora, 1879, 554; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 140; Aschers. et Schweinf. Ill. Fl. Égypte, 157; Schweinf. Beitr. Fl. Aethiop. 215; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 611, in Durand & Schinz, Conspect. Fl. Afr. v. 550, and in Bull. Herb. Boiss. iv. Append. iii. 29; Terrac. in Bull. Soc. Bot. Ital. i. 426; Engl. Hochgebirgsfl. Trop. Afr. 143; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 48; Rendle in Cat. Afr. Pl. Welw. ii. 118; not of A. Rich. *C. jeminicus*, Retz. Obs. iv. 11; C. B. Clarke in Journ. Linn. Soc. xxi. 175, t. 2, figs. 17–18 (excl. var. β), and in Journ. Bot. 1890, 18, with fig.; not of Rottb. *C. laxus*, R. Br. in Salt, Abyss. Append. 62. *C. bulbiferus*, Dietr. Sp. Pl. ii. 324. *C. rotundus*, Kunth, Enum. ii. 58 partly, not of Linn.

Upper Guinea. Senegal, *Roger! Perrottet*, 883! Cape Verd Isles: St. Nicolao, *Bolle!*

Nile Land. Nubia: Wady O-Mareg, *Schweinfurth*, 406! Hor Tamanib, near Suakin, *Lord!* Abyssinia: in cultivated places near Gursarfa, in the Tacazze Valley, 3000–4000 ft., *Schimper*, 2238! and without precise locality, *Salt! Schimper*, 96! 1250! Somaliland, *Mrs. Lort-Phillips! Keller*, 79! 82!

Lower Guinea. Lower Congo? Kimuenza, *Gillet!* Angola: Loanda; sandy shores near the mouth of the River Cuanza, *Welwitsch*, 7073! near the sea at Zamba Grande and Cabo Lombo, *Welwitsch*, 7074! Mossamedes: near Cavalheiros, *Welwitsch*, 6852!

Also in Egypt, Arabia, India and North Australia.

76. **C. usitatus,** *Burchell, Trav. S. Afr.* i. 417 *in note.* Bulbs (whence spring the stems) $\frac{1}{4}$ in. or more in diam., coat scarious shining chestnut-brown; otherwise nearly as *C. bulbosus.*—Kunth, Enum. ii. 107; Boeck. in Linnæa, xxxv. 511; C. B. Clarke in Journ. Linn. Soc. xxi. 176 (excl. syn. *C. semitrifidus*, Schrad.), in Durand & Schinz, Conspect. Fl. Afr. v. 581, in Dyer, Fl. Cap. vii. 179, and in Bull. Herb. Boiss. iv. Append. iii. 31.

Lower Guinea. Hereroland: Omaruru, *Schinz*, 523! Amboland: between Olukonda and Uukuambi, *Rautanen*, 20.

Frequent in South Africa.

77. **C. grandibulbosus,** *C. B. Clarke.* Glabrous. Bulb shortly below the base of the stem, more than $\frac{1}{3}$ in. in diam., with a black hard coat. Stem 22 in. long, rather stout, striate, at the top trigonous and smooth. Leaves longer than the stem, $\frac{1}{6}$–$\frac{1}{5}$ in. broad. Umbel reduced to a dense compound head, 1 in. in diam. of 30 spikelets, at the base

subcorymbose; bracts 6–7, up to 8 in. long, similar to the leaves. Spikelets $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{6}$ in., compressed, 8–14-flowered. Glumes strongly striated, pale ferruginous with green keel, obtuse with a microscopic mucro.

Nile Land. British East Africa: Taita; Ndi Mountain, in dry sand on rocks, *Scott-Elliot*, 6284!

This plant is, in a word, *C. bulbosus* on a very large scale. The pale ferruginous-green colour of the heads is not to be seen in any of the numerous examples of *C. bulbosus*.

78. **C. blysmoides,** *Hochst. in Flora*, 1844, 102. Stem, basal bulb, and leaves, exactly as in depauperated examples of *C. bulbosus*. Inflorescence not at all umbel-like, a simple narrow-oblong spike of 6 spikelets; bracts hardly any. Spikelets $\frac{1}{4}$ by $\frac{1}{16}$ in., 3–5-flowered, chestnut-red; otherwise as *C. bulbosus*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 550. *C. bulbosus*, var. *spicatus*, Boeck. in Linnæa, xxxvi. 301; Martelli, Fl. Bogos. 90; Engl. Hochgebirgsfl. Trop. Afr. 143. *Hemichlæna bulbosa*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 509.

Nile Land. Eritrea: Bogos, *Steudner*, 932! Abyssinia: near Enderdert in the district of Shoata, *Schimper*, 580! Gondar, *Héricourt!* Adowa, *Quartin-Dillon & Petit!* and without precise locality, *Schimper*, 17! 188! British East Africa: Gilgil River, 6000–7000 ft., *Scott-Elliot*, 6650!

79. **C. Stuhlmanni,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 578. Glabrous. Stem 12 in. long, slender bearing bulbs (*K. Schumann*). Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{6}$ in. broad, flaccid. Head 1, dense, of 15 dark-red-brown spikelets; bracts 4, like the leaves, much exceeding the head. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{10}$ in., about 8-flowered. Glumes rounded on the back, very strongly striate, obtuse. Style-branches 3, much exserted, dark-red.—*C. Stuhlmannii*, K. Schum. in Engl. Pfl. Ost-Afr. C. 118.

Mozamb Dist. German East Africa: Karagwe; Kafuro, 4400 ft., *Stuhlmann*, 1826!

The examples are young, so that it cannot be stated positively whether this is a *Cyperus* or a *Mariscus*. Boeckler marked it *Cyp. leptophyllus*, var., i.e. a *Mariscus*. The authentic piece at Kew shows a short slender rhizome only; the bulbils mentioned by K. Schumann make it almost certainly a *Cyperus* near *C. bulbosus*.

80. **C. microbolbos,** *C. B. Clarke*. Glabrous. Stolons $\frac{1}{2}$–$\frac{2}{3}$ in. long, capillary, with thin yellow-brown scales, bearing near their ends bulbs $\frac{1}{12}$ in. in diam. Stems 3 in. high, rising from a bulb, slender. Leaves twice as long as the stems, setaceous, weak. Inflorescence of 1 spike or an umbel of 2 spikes, the ray $\frac{1}{4}$ in. long; bracts 2, exceeding the umbel, setaceous, weak. Spike of 3–5 loosely arranged spikelets. Spikelets $\frac{1}{2}$ by $\frac{1}{8}$ in., compressed, with parallel sides, chestnut-coloured, 24-flowered; rhachilla hardly winged. Glumes boat-shaped, ovate, the yellow keel excurrent in a short green mucro. Stamens 3; anthers linear-oblong, apiculate. Nut $\frac{1}{2}$ the length of the glume (exclusive of

the mucro), ellipsoid, trigonous, pyramidal at the base and apex, dark-brown; style nearly as long as the nut; branches 3, long, exserted.

Nile Land. Nubia: Coast land to between 3000 and 4000 ft., *Bent !*

81. **C. callistus,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 143. Glabrous. Stolons long, very slender, bearing bulbs near their ends. Stem 8–24 in. long, much thickened at the base by the dilated chestnut-brown leaf-sheaths. Leaves as long as the stem, $\frac{1}{4}$–$\frac{1}{2}$ in. broad at the base, but with whip-like ends. Umbel 4–10 in. in diam., compound; bracts and bractlets (of the secondary umbels) long with whip-like ends. Spikes, spikelets, and flowers nearly as of *C. bulbosus*, Vahl.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 551; K. Schum. in Engl. Pfl. Ost-Afr. C. 121; Rendle in Cat. Afr. Pl. Welw. ii. 119.

Upper Guinea. Dahomey, *Newton*, 10!

Nile Land. Uganda, *Wilson*, 151!

Lower Guinea. Angola: Loanda, 1000 ft., *Welwitsch*, 7079! Huilla; in dried-up swamps near Wene, *Welwitsch*, 6878 (ex *Ridley*). German South-west Africa: Dammaraland, *Een !*

Mozamb. Dist. German East Africa: Kagehi, *Fischer*, 630!

82. **C. fulgens,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 563. Glabrous. Stolons 2–6 in. long, hardly $\frac{1}{30}$ in. in diam., clothed by bright yellow-brown thin scales, producing near their ends ovoid bulbs exceeding $\frac{1}{2}$ in. in diam., with a thick black longitudinally-striate coat. Stem springing from the bulb, carrying up the lowest node near the surface of the ground and there rooting (as in the Cape *C. usitatus*, Burchell), 1–2 ft. long, rather stout, acutely triquetrous at the top. Leaves as long as the stem, up to $\frac{1}{3}$–$\frac{1}{2}$ in. broad, tough, thick, shining. Umbel simple or subcompound, 4–5 in. in diam., open; bracts 4–5, similar to the leaves, lowest overtopping the umbel. Spikes of 8–30 spikelets rather loosely arranged. Spikelets spreading at right angles, shining-red, $\frac{1}{2}$ by $\frac{1}{10}$ in., compressed, 7–10-flowered; wings of the rhachilla persistent, holding back for a time the ripe nut. Glumes rather remote, rounded on the back, strongly striate, muticous, sub-acute. Nut $\frac{1}{2}$ the length of the glume, oblong-obovoid; style shorter than the nut, with 3 long branches.—C. B. Clarke in Bull. Herb. Boiss. iv. Append. iii. 30.

Lower Guinea. German South-west Africa: Hereroland, *Fleck*, 642!

Mozamb. Dist. British Central Africa: Ngamiland; between Koobie (Kobis) and North Shaw Valley, *Baines !* Kwebe Hills, 3300–3500 ft., *Mrs. Lugard*, 104!

Also received lately from the Kalahari.

This species is like, and exceedingly near in structure, to *C. esculentus*, of which the bulbs differ (being zonate). But the shining foliage and very glistening red spikelets suffice to distinguish it.

83. **C. esculentus,** *Linn. Sp. Pl. ed.* 2, 67. Glabrous. Stolons very slender, bearing bulbs near their ends; ripe bulbs $\frac{1}{2}$ in. and upwards in diam., zonate by horizontal lines. Stems 6–24 in. long, trigonous

at the top. Leaves often $\frac{1}{2}$–$\frac{3}{4}$ the length of the stem, $\frac{1}{6}$–$\frac{1}{4}$ in. broad. Umbel compound or nearly simple, 3–12 in. in diam.; bracts 3–5, similar to the leaves, as long as the umbel or longer. Spikes of 4–30 spikelets. Spikelets $\frac{1}{4}$–$\frac{3}{4}$ by $\frac{1}{10}$ in., with parallel sides, compressed but more or less turgid, from pale yellow to deep brown, 6–30-flowered; rhachilla winged. Glumes obscurely keeled, muticous, prominently striate. Nut scarcely $\frac{1}{2}$ the length of the glume, obovoid; style much shorter than the nut, with 3 often much exserted branches. —Kunth, Enum. ii. 61; Boeck. in Linnæa, xxxvi. 287; Coss. & Durieu, Expl. Scient. Algér. Glum. 246; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 616, in Durand & Schinz, Conspect. Fl. Afr. v. 559, in Bull. Herb. Boiss. iv. Append. iii. 29, and in Dyer, Fl. Cap. vii. 180; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 138 partly; Engl. Hochgebirgsfl. Trop. Afr. 142; K. Schum. in Engl. Pfl. Ost-Afr. C. 120; Durand & Schinz, Études Fl. Congo, i. 287; Volk. Kilimand. 285; De Wild. & Durand in Comptes-rendus Soc. bot. Belg. xxxvi. 88; Urban, Symb. Antill. ii. 33; Rendle in Cat. Afr. Pl. Welw. ii. 117. *C. phymatodes*, Muhl. Descr. Gram. 23; Kunth, Enum. ii. 62; Schweinf. Beitr. Fl. Aethiop. 215. *C. melanorrhizus*, Del. Fl. Ægypt. Illust. 50. *C. scirpoides*, R. Br. ex Hochst. in Flora, 1841, i. Intell. 21. *C. rotundus*, var. (an *C. lucidulus*, Klein ?), Benth. in Hook. Niger Fl. 550 in Obs. *C. Buchanani*, Boeck. Cyp. Novae, i. 4. *C. chrysostachys*, Boeck. in Flora, 1859, 438 bis. *C. auricomus*, herb. Sieber. partly.

Upper Guinea. Cape Verd Islands, *Cardosa*, 250! *Moseley!* *Bolle!* Senegal, *Heudelot*, 518! *Leprieur*, 2! *Roger!* *Lécard*, 117! Sierra Leone, *Vogel*, 31! Dahomey, *Newton!* River Niger, *Baikie!* Cameroons: Yaunde, 2600 ft., *Zenker & Staudt*, 517!

Nile Land. Eritrea: near Keren, *Steudner*, 903, partly! Kordofan, *Kotschy*, 52! *Pfund*, 632! Abyssinia, *Schimper*, 21! 62! 273! 1205! 1246! British East Africa: Jur; Kurshook Ali's Seriba, *Schweinfurth*, 1731! Kivata in Ruwenzori region, 6000 ft., *Scott-Elliot*, 7740!

Lower Guinea. Princes Island, *Mann!* Lower Congo; near Stanley Pool at Kinchassa, *Hens*, B, 49! Boma, *Hens*, 392, partly! Angola: Dondo, *Mechow*, 9! 92! Underton and San Salvador, *Buettner*, 6! 17! Malange, *Pogge*, 463! Golungo Alto; in gravelly places at the foot of Mount Cungulungulo, *Welwitsch*, 7098! around Sange and throughout Sobato Bumba, *Welwitsch*, 7102, partly! Pungo Andongo; near the Præsidium, *Welwitsch*, 6907, partly! German South-west Africa: Dammaraland, *cultivated specimen!*

South Central. Congo Free State, *Dewèvre*, 474!

Mozamb. Dist. Zanzibar, *Taylor!* German East Africa: Kilimanjaro, 3500–5000 ft., *Volkens*, 660! 2111! Lake Tanganyika, *Cameron!* British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 23! Namasi, *Cameron*, 14! Zomba, 2800–3500 ft., *Whyte!* and without precise locality, *Buchanan*, 446!

In nearly all warm countries, abundant in America.

The bulbs are roasted and eaten in Dammaraland, as in many other countries. This species is much confused with the universal *C. rotundus*, from which it is most readily distinguished by the markedly striate glumes.

84. **C. articulatus,** *Linn. Sp. Pl. ed.* 2, 66. Glabrous. Stolons long, hardening into stout woody rhizomes. Stems 3–6 ft. high, at the top

round or nearly so, showing (at least when dry, owing to shrinkage of the pith) transverse-rings $\frac{1}{2}$–$1\frac{1}{2}$ in. apart. Leaves 0, or the green termination of the top sheath rarely 1 in. long. Umbel 4–8 in. in diam., compound or smaller (sometimes hardly 1 in. in diam.) with few spikelets; bracts $\frac{1}{4}$–$\frac{3}{4}$ in. long, elliptic-lanceolate. Spikes of 3–4 spikelets, but several congested into 1 apparent spike of numerous spikelets. Spikelets $\frac{1}{3}$–1 by $\frac{1}{20}$–$\frac{1}{12}$ in., 12–50-flowered, linear, straw-coloured or dirty-brown. Glumes obtuse, scarcely keeled. Nut $\frac{3}{5}$ the length of the glume, oblong-ellipsoid, black; style-branches 3, long, little exserted.—Kunth, Enum. ii. 53; Barker Webb in Hook. Niger Fl. 182; Boeck. in Linnæa, xxxvi. 274; T. Thoms. in Speke, Nile, Append. 653; Oliver in Trans. Linn. Soc. xxix. 165; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 141 partly; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 611, in Durand & Schinz, Conspect. Fl. Afr. v. 548, and in Bull. Herb. Boiss. iv. Append. iii. 29; K. Schum. in Engl. Pfl. Ost-Afr. C. 120; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 48, 102; Durand & Schinz, Études Fl. Congo, i. 283; Urban, Symb. Antill. ii. 33; Rendle in Cat. Afr. Pl. Welw. ii. 117. *C. niloticus*, Forsk. Fl. Ægypt.-Arab. 13; Beauv. Fl. Owar. ii. 63, t. 97, fig. 2. *C. fistulosus*, Ehrenb. ex Boeck. in Linnæa xxxvi. 275.

Upper Guinea. Senegal; *Sieber*, 101! Dollinger, 58! *Heudelot*, 522! Cape Verd Islands: St. Antonio, *Lowe!* St. Nicolao, *Lowe! Bolle!* St. Iago, *Brunner!* Gambia, *Heudelot*, 344! Sierra Leone: River Bagru, *Mann*, 894! Gold Coast: Accra; *Buettner!* Ashanti, *Bowdich!* Niger Territory: Old Calabar, *Robb!* Confluence of the River Quorra (Niger) and the River Tchadda (Benue), *Barter!* Cameroons, *Buchholz!* Fernando Po, *Barter!*

Nile Land. Eritrea: Ainsaba Valley near Keren, *Steudner*, 905! Habab district, 5500 ft., *Hildebrandt*, 361B! Somaliland, *Keller*, 92! 95! British East Africa: banks of the White Nile, *Petherick!* Speke & Grant! east side of the Albert Edward Nyanza, *Scott-Elliot*, 8051! Mombasa, *Taylor!*

Lower Guinea. Gaboon: Salowe, *Soyaux*, 273! Lower Congo, *Smith*, 14! 26! Angola: Congo; edges of lakes at Quizembo, *Welwitsch*, 7034! Ambriz, *Monteiro!* Icolo e Bengo; edges of Lagoa da Funda, *Welwitsch*, 7051! 7089; Pungo Andongo; banks of the River Cuanza, *Welwitsch*, 6936!

South Central. Congo Free State; Monbuttu; Munza, *Schweinfurth*, 3446! by the River Sankuru, *Demeuse!* Mzona, *Descamps*! Lunda, *Pogge*, 1586!

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1058! *Schmidt*, 65! German East Africa: Usambara; Masheua, *Holst*, 3521! Kilimanjaro; Lake Yipe, 2500 ft., *Volkens*, 2372! 2387! Portuguese East Africa: Mozambique, *Peters*, 8! Luabo River, *Kirk!* British Central Africa: Nyasaland; Elephant Marsh in the Shire Valley, *Scott!* Ngamiland; Lake River, *Lugard*, 12!

In the tropical and warm regions of both hemispheres.

85. **C. corymbosus,** *Rottb. Descr. et Ic.* 42, *t.* 7, *fig.* 4. Stem at the top round, or round trigonous, not (or very obscurely) transversely septate when dry. Leaves (i.e. the green portion) attaining sometimes 5 in. in length, but usually very short or hardly any. Bracts usually $\frac{1}{4}$–$\frac{3}{4}$ the height of the umbel, but sometimes overtopping it. Spikes less clustered; otherwise as *C. articulatus*.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 612, in Durand & Schinz, Conspect. Fl. Afr. v. 554,

and in Dyer, Fl. Cap. vii. 181; Rendle in Cat. Afr. Pl. Welw. ii. 116. *C. diphyllus*, Retz. Obs. v. 11; Kunth, Enum. ii. 54; Boeck. in Linnæa, xxxvi. 272, var. β, not of Benth. *C. articulatus*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 141 partly.

Lower Guinea. Angola: Pungo Andongo; banks of the River Lombe *Welwitsch*, 6937!

Also in Natal and Madagascar, extending to India, and in the warm parts of America.

86. **C. schimperianus,** *Steud. Syn. Pl. Glum.* ii. 34. Glabrous. Stems 1–3 ft. long, approximate on a woody rhizome, round, at the very top round or hardly round-trigonous. Leaves short, rarely $\frac{1}{3}$ the length of the stem, $\frac{1}{5}$ in. broad. Umbel 3–10 in. in diam., usually compound; bracts 4–7, usually exceeding the umbel, similar to the leaves. Spikes of 3–20 loosely arranged spikelets, often drooping. Spikelets $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{8}$ in., compressed, chestnut-brown or bright brown, 12–24-flowered; wings of rhachilla narrow oblong, separating from the glume, finally deciduous; glumes elliptic, obtuse, not striate, in fruit very distant. Nut $\frac{1}{2}$ the length of the glume, oblong-obovoid; style-branches 3, long.—Boeck. in Linnæa, xxxvi. 277, and in Flora, 1879, 551; Schweinf. Beitr. Fl. Aethiop. 216, Pl. Nilot. 40, and in Bull. Herb. Boiss. ii. Append. ii. 48; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 576; Engl. Hochgebirgsfl. Trop. Afr. 142. *C. elongatus*, Lej. ex Nees in Linnæa, ix. 285 (name only). *C. truncatus*, A. Rich. Tent. Fl. Abyss. ii. 487. *C. amblyleptos*, Steud. Syn. Pl. Glum. ii. 30. *C. longus*, Hochst. in Flora, 1841, i. Intell. 21; A. Rich. Tent. Fl. Abyss. ii. 484; T. Thoms. in Speke, Nile, Append. 653; Oliver in Trans. Linn. Soc. xxix. 165, not of Linn. *C. tegetum*, C. B. Clarke in Journ. Linn. Soc. xxi. 160 partly. *C. longus*, var. *elongata*, C. B. Clarke in Journ. Linn. Soc. xxi. 166 partly. *C. phymatodes*, Schweinf. Beitr. Fl. Aethiop. 215? not of Muhl. *C. nudiculmis*, Sieber ex C. B. Clarke in Journ. Linn. Soc. xxi. 161. *C. esculentus*, herb. Sieber partly. *C. aterrimus*, Boeck. ex C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 576.

Nile Land. Ethiopia, *Kotschy*, 361! Nubia: on rocks in the Nile about Mount Rayan, at the Gherri Cataract, *Speke & Grant!* Dongola, *Ehrenberg!* Sedob, *Schweinfurth*, 616! Berber, *Schweinfurth*, 743! Abyssinia: near Adowa, *Schimper*, 57! 1994! Hamedo, 4900 ft., *Schimper*, 854! Ungea, 5900 ft., *Schimper*, 569! and without precise locality, *Schimper*, 539! 688! *Rohlfs and Stecker*, 48!

Mozamb. Dist. German East Africa: Usambara; Bombuera, *Holst*, 2209! Kilimanjaro, 5000 ft., *Taylor*.

This species is readily separated from *C. longus*, Linn. (with which it has been greatly confused) by the glumes standing altogether separate in fruit with their margins inrolled. The species is so close to the Indian *C. tegetum*, Roxb., that I can allege no difference except the remarkable roundness of the stem in *C. schimperianus*, which character distinguishes it also from its African neighbours.

87. **C. aterrimus,** *Steud. Syn. Pl. Glum.* ii. 31. Glabrous. Stems 2–3 ft. long, approximate on a very short rhizome, at the top acutely triquetrous. Leaves $\frac{3}{4}$ the length of the stems, $\frac{1}{3}$ in. broad. Umbel 3–8 in. in diam., with unequal divaricate (often reflexed) rays;

bracts 4–6, up to 10–16 in. long, similar to the leaves. Spikes elongate, loose, of 10–40 spikelets. Spikelets $\frac{2}{3}$–1 by $\frac{1}{8}$ in., dark chestnut, 10–20-flowered; wings of rhachilla narrow, subpersistent. Glumes elliptic, obtuse, not striate, in fruit with enrolled margins not imbricate. Nut $\frac{1}{2}$–$\frac{3}{5}$ the length of the glume, oblong-obovoid; style-branches 3, long.—Boeck. in Linnæa, xxxvi. 299; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 549; Engl. Hochgebirgsfl. Trop. Afr. 142. *C. distans*, var. *kilimandscharica*, K. Schum. in Engl. Fl. Ost-Afr. C. 120.

Nile Land. Abyssinia: Samen; near Debra Eski, *Schimper*, 233! Begemeder; near Debra Tabor, 9100 ft., *Schimper*, 1249! and without precise locality, *Roth!* 10,000 ft., *Schimper*, 1008! 2448!

Mozamb. Dist. German East Africa: Kilimanjaro; 5000 ft., *Volkens*, 2276! British Central Africa: Nyasaland, Mount Zomba, 4000–6000 ft., *Whyte!*

This species differs from *C. schimperianus*, Steud., only by the longer leaves. K. Schumann has finally arranged it (i.e. Volkens, 2276) as a variety of *C. distans*, Linn. f.; it differs from the black variety of that species by the stem being acutely triquetrous at the top, the broader spikelets, and especially by the nut being widened towards the top; but it is critically near.

88. **C. atroviridis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 549. Stems 6–9 in. long. Umbel congested into a compound head, $\frac{3}{4}$–$1\frac{1}{4}$ in. in diam., of 15–25 spikelets. Glumes chestnut, with a broad striated green band down the back; otherwise as *C. aterrimus*.—*C. adoensis*, Hook. f. in Journ. Linn. Soc. vii. 225, not of Hochst.

Upper Guinea. Fernando Po, 9000 ft., *Mann*, 1466!
It may possibly be a subalpine depauperated state of *C. aterrimus*.

89. **C. maranguensis,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 120. Glabrous. Stem 2 ft. high, at the base erect from a woody rhizome, at the top trigonous. Leaves as long as the stem, up to $\frac{1}{2}$ in. broad. Umbel 7 in. in diam., compound; bracts 5, lowest nearly 1 ft. long, similar to the leaves. Spikes loosely spicate, of 12–15 spikelets. Spikelets lurid green, up to $\frac{2}{3}$ by $\frac{1}{12}$ in., 10–16-flowered; wings of rhachilla oblong, persistent. Glumes elliptic, obtuse, distant. Style short; branches 3, shortly exserted from the glume. Nut $\frac{2}{3}$ the length of the glume, oblong ellipsoid.

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 5000 ft., *Volkens*, 649! Mochi, 4000–5000 ft., *Taylor!*

This species appears from the unusual black-green colour of the spikelets very distinct. The example is not fully ripe; the lower empty glume has a long tail, the upper empty glume has a short point; from this I think it not improbable that the species may prove a *Mariscus* near *M. eurystachys* and *M. foliosus*.

Var. *ferrugineoviridis*, C. B. Clarke. Stolons numerous, stout. Stem at the base erect, at the top thick, fluted. Leaves and bracts numerous, broad. Glumes green on the back, ferruginous on the sides.

Nile Land. British East Africa: Ruwenzori, 5300 ft., *Scott-Elliot*, 7590!

Mozamb. Dist. German East Africa: Kilimanjaro; 3500 ft., *Volkens*, 1620!

This has been issued from Berlin as *C. fenzelianus*, Steud., to which it is not (owing to the very remote glumes) closely allied. It may prove a new species.

90. **C. nubicus,** *C. B. Clarke.* Glabrous. Stolons $\frac{1}{12}$ in. in diam., hardening into rhizomes. Stems up to 2 ft. long, triquetrous at the top, at the base erect, not at all bulbous. Leaves 12 by $\frac{1}{4}$–$\frac{1}{3}$ in. Umbel 5–8 in. in diam., compound, dense with numerous spikelets, a bright ferruginous-red; bracts 3–4, the lowest overtopping the umbel, similar to the leaves. Spikelets loosely spicate, up to 1 by $\frac{1}{6}$ in., compressed, 20–30-flowered; wings of the rhachilla ovate, hyaline, conspicuous, finally deciduous. Glumes ovate-lanceolate, slenderly striate, acute, hardly mucronate, distant, in fruit spreading and hardly imbricate. Style short; branches 3, long, exserted. Nut $\frac{2}{5}$ the length of the glume, oblong-ellipsoid, black.

Nile Land. Nubia: sea-coast, to between 3000 and 4000 ft., *Bent!* Mount Erau, *Cholmley!* Somaliland: Berbera maritime plain at Dobar Waina, 500 ft., *Miss Edith Cole!*

This species is perhaps more nearly allied to some of the very large bright-coloured forms of *C. rotundus*.

91. **C. Zollingeri,** *Steud. in Zoll. Verz. Ind. Archip.* ii. 62. Glabrous. Stems 1–3 ft. long, slender for their length, trigonous, smooth at the top, suberect at the base; stolons slender, clothed by striate brown scales, hardening into slender woody rhizomes. Leaves $\frac{1}{2}$–$\frac{2}{3}$ the length of the stem, narrow, sometimes attaining $\frac{1}{4}$ in. in breadth. Umbel irregular, straggling, usually nearly simple, but sometimes compound with the secondary rays up to 4–6 in. long, and the primary rays up to 6–12 in. long, sometimes with more numerous long rays, sometimes with 1–2 rays, or reduced to a head; bracts about as long as the rays, or in the case of a contracted umbel much longer, similar to the leaves; in the case of numerous rays the bracts are also numerous. Spikes very loosely spicate, of 3–9 spikelets. Spikelets 1 by $\frac{1}{6}$ in., 20-flowered, yellow-green, compressed, subquadrangular; wings of rhachilla oblong, hyaline, finally deciduous. Glumes distant on the rhachilla, ovate-oblong, obtuse, acute or mucronate; margins broad, nerveless, yellow; keel broad, green, closely 5–7-nerved. Nut $\frac{1}{2}$ the length of the glume, obovoid, black, hardly curved. Style short; branches 3, long, shortly exserted.—Steud. Syn. Pl. Glum. ii. 17; Boeck. in Linnæa, xxxvi. 352; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 613, and in Durand & Schinz, Conspect. Fl. Afr. v. 581; De Wild. & Durand in Comptes-rendus Soc. bot. Belg. xxxvi. 89; K. Schum. in Engl. Pfl. Ost-Afr. C. 120; Durand & Schinz, Études Fl. Congo, i. 294; Rendle in Cat. Afr. Pl. Welw. ii. 117. *C. tenuiculmis*, Boeck. in Linnæa, xxxvi. 286, and in Engl. Gazelle Reise, Bot. 15, not Boeck. in Flora, 1879, 554. *C. sphacelatus*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 139 partly, not of Rottb. *C. lucidulus*, C. B. Clarke

in Journ. Linn. Soc. xxi. 99; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 139 partly, not of Klein nor of Kunth.

Upper Guinea. Sierra Leone: near Freetown, *Afzelius! Welwitsch*, 7058! Senegal, *Heudelot*, 458! 559! *Lécard*, 149! Gambia, *Mungo Park!* Lagos; *Millen*, 107!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 355! Lower Congo: Kimuenza, *Gillet!* Stanley Pool, 1000–2000 ft., *Hens*, 34! 56! 399! Kisantu, *Gillet*, 510! 1511! Angola: Pungo Andongo; between the River Cuanza and Caghuy, *Welwitsch*, 6940 partly!

South Central. Congo Free State: Lunda; Mukenge, *Pogge*, 1578! 1583! 1610!

Mozamb. Dist. German East Africa: Usambara; Tanga, *Holst*, 2026! Portuguese East Africa: Mozambique, *Kuntze*, 202! British Central Africa: Zambesi Valley; Boruma, *Menyharth*, 658!

Also in Tropical and Sub-tropical Asia and Australia.

Var. *parva*, C. B. Clarke. Plants small, slender, with very narrow leaves, much depauperated umbel, and dull-coloured hardly at all yellow spikelets.

Lower Guinea. Lower Congo: Lutete, 1800–2000 ft., *Hens*, A, 220!

South Central. Congo Free State: Bussindi, 950 ft., *Hens*, C, 159! Equatorville, *Hens*, C, 178! Lusambo, on the River Sankuru, *Duchesne*, 16!

In Hens, 159, 178, the stems are sometimes reduced to 4 in. long, and the umbel to a single head of 3–5 spikelets. In the variety *robusta*, K. Schum. in Engl. Pfl. Ost-Afr. C. 120 (i.e. Holst, 2026), the umbel is more than 2 ft. in diam. The species varies greatly in development in India; it can generally be recognised by the distant glumes and subquadrangular spikelets.

92. **C. schweinfurthianus,** *Boeck. in Flora*, 1879, 553. Stem tall, at the top very scabrous. Glumes apiculate; otherwise as *C. Zollingeri*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 576; Rendle in Cat. Afr. Pl. Welw. ii. 117. *C. tenuiculmis*, Boeck. in Linnæa, xxxvi. 286, and in Engl. Jahrb. v. 91 partly. *C. lucidulus*, C. B. Clarke in Journ. Linn. Soc. xxi. 99 partly; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 139 partly, not of Klein.

Upper Guinea. Togo, *Kling*, 71! Lagos: Abeokuta, *Irving!* Niger Territory; Nupe, *Barter*, 1573! Lokoja district, *Richardson*, 4!

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2318! Ruwenzori; Semliki Valley, *Scott-Elliot*, 7992!

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 586! Angola: Pungo Andongo; Quitage on the River Cuije, *Welwitsch*, 6940, partly!

Var. ? *levicaulis, C. B. Clarke.* Stem quite smooth at the top, 2 ft. long. Umbel compound; primary rays 3–4 in. long. Spikelets (young) $\frac{1}{2}$ by nearly $\frac{1}{6}$ in., somewhat lanceolate (i.e. narrowed at both ends), very flat, yellow.

Mozamb. Dist. British Central Africa: Urungu; Fwambo, *Carson*, 19!

I doubt this being any variety of *C. schweinfurthianus*. The inflorescence and flat lanceolate spikelets are more like those of *C. fenzelianus*; but the spikelets are too broad for that species or *C. rotundus* or any of its neighbours.

93. **C. elatior,** *Boeck. in Flora*, 1879, 553, *not in Linnæa*, xxxvi. 327. Stem $2\frac{1}{2}$ ft. high, at the top smooth. Umbel compound; rays up to 10 in. long. Spikelets 1 by $\frac{1}{6}$ in., 20–30-flowered, suberect;

otherwise as *C. Zollingeri*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 559.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2280!

South Central. Congo Free State; Nlemfu, *Butaye!*

This looks like a very large variety of *C. Zollingeri*.

94. **C. gracilinux**, *C. B. Clarke in Journ. Linn. Soc.* xxi. 162. Glabrous. Stems 2 ft. high, at the top trigonous and smooth; stolons numerous, slender, clothed by striate brown scales. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{5}$ in. broad. Umbel 6–12 in. in diam., compound, open; bracts much longer than the umbel, similar to the leaves. Spikes loosely spicate, of 5–11 spikelets. Spikelets $\frac{2}{3}$ by $\frac{1}{10}$ in., compressed, hardly at all quadrangular, 10–16-flowered, dirty-white; wings of rhachilla elliptic-lanceolate, hyaline. Glumes approximate on the rhachilla, ovate-oblong subobtuse, ultimately obliquely spreading but imbricate. Nut $\frac{3}{5}$ the length of the glume, oblong or narrowly ellipsoid; style 3-fid.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 564; Durand & Schinz, Études Fl. Congo i. 288. *C. tenuiculmis*, Boeck. in Flora, 1879, 554, not Boeck. in Linnæa, xxxvi. 286.

Upper Guinea. Senegal, *Lécard*, 103! 129! Sierra Leone, *Afzelius!* Central Africa; *Vogel!* Niger, *Baikie!*

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2016! 2029!

95. **C. locuples,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 566. Glabrous. Rhizome creeping. Stem 1 ft. high, rather stout, at the top trigonous and smooth. Leaves $\frac{3}{4}$ the length of the stem, $\frac{1}{6}$–$\frac{1}{5}$ in. broad. Umbel 6–8 in. in diam., very dense; bracts overtopping the umbel, similar to the leaves. Spikelets 40-60 together in dense spikes, dusky straw-coloured, $1\frac{1}{2}$ by $\frac{1}{12}$ in., up to 60-flowered, slightly compressed; wings of the rhachilla linear-lanceolate, falcate. Glumes approximate on the rhachilla, scarcely $\frac{1}{12}$ in. long, ovate, obtuse. Nut $\frac{1}{2}$ the length of the glume, ovoid, chestnut-black; style as long as the nut; branches 3, linear, exserted.

Upper Guinea. Niger Territory: Nupe; Muye on the Niger, *Barter*, 187!

96. **C. natalensis,** *Hochst. ex Krauss in Flora*, 1845, 755. Glabrous. Rhizome long-creeping, $\frac{1}{10}$ in. in diam. Leaves 0 in Krauss' description, often 2–6 in. long, in Krauss' type 26 in. long, up to $\frac{1}{4}$ in. broad. Umbel-rays 3–6, up to 1–4 in. long, the secondary umbel at the end of each congested into a compound head of 12–35 spikelets; bracts usually short, but overtopping the umbel when the leaves are long. Spikelets $\frac{2}{3}$ by $\frac{1}{10}$ in., very slightly compressed, dirty straw-coloured, 12–24-flowered, wings of rhachilla linear, i.e. hardly any. Glumes ovate, hardly acute, 9–11-nerved, in fruit obliquely spreading but imbricate, hard in texture. Nut hardly $\frac{2}{3}$ the length of the glume, oblong, obtuse, chestnut-black. Style nearly as long as the nut; branches 3, linear, exserted.—Boeck. in Linnæa, xxxvi. 343; C. B.

Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 570, and in Dyer, Fl. Cap. vii. 181.

Mozamb. Dist. Portuguese East Africa: Zambesi Delta; Kongone River, *Kirk !*

Frequent in South Africa.

The Zambesi example is the variety *longibracteata*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 570; but I find (in this as in many other species of *Cyperaceæ*) the development of the leaves and bracts so variable that not even a variety can be established on such a character.

97. **C. maculatus,** *Boeck. in Peters, Reise Mossamb. Bot.* 539. Glabrous. Stolons $\frac{1}{16}$–$\frac{1}{12}$ in. in diam., long, not always present. Stems 12–20 in. long, at the top trigonous and smooth, at the base suberect and bulbous, sometimes (as in Baikie's examples) with the bulb $\frac{1}{3}$ in. in diam., solid, woody. Leaves nearly as long as the stem, $\frac{1}{8}$–$\frac{1}{5}$ in. broad. Umbel compound, sometimes open, 4–6 in. broad, more often 2–4 in. broad, not rarely contracted almost in a head; bracts 3–5, similar to the leaves, the lowest overtopping the umbel. Spikes loosely spicate, of 5–11 spikelets, in flower divaricate, but in dried specimens usually clustered, erect. Spikelets $\frac{1}{2}$ by $\frac{1}{20}$–$\frac{1}{16}$ in., much compressed, exactly linear with parallel sides, 20-flowered, straw-coloured or frequently purple-spotted; wings of the rhachilla very narrow. Glumes ovate, boat-shaped, obtuse, 1–3-nerved, approximate on the rhachilla, in dried specimens usually tightly imbricated; margins shining, scarious. Style shorter than the nut; branches 3, linear, exserted.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 567; K. Schum. in Engl. Pfl. Ost-Afr. C. 120; Durand & Schinz, Études Fl. Congo, i. 289. *C. longus*, var. *zmaculatus*, Boeck. in Linnæa, xxxvi. 282. *C. naumannianus*, Boeck. in Flora, 1879, 552, in Engl. Jahrb. v. 91, and in Engl. Gazelle Reise Bot. 15. *C. stoloniferus*, var. β, Boeck. in Linnæa, xxxv. 490. *C. galegensis*, C. B. Clarke in Journ. Linn. Soc. xx. 285. *C. Baikiei*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 550. *C. rotundus*, Benth. in Hook. Niger Fl. 550 partly.

Upper Guinea. Senegal, *Leprieur !* Sierra Leone: between Bumban and Port Lokko, *Scott-Elliot*, 5676 ! Cape Verd, *Perrottet !* Niger Territory: Nupe; in sandy soil near the river, *Barter*, 1213 ! 1571 ! River Niger, *Baikie !*

Nile Land. Nubia: Mograd Island, in the Nile, near Abu-Hammed, *Kotschy*, 358 !

Lower Guinea. Lower Congo: Stanley Pool, 1000 ft., *Hens*, 22 ! banks of the Congo, *Smith*, 47 ! 75 !

South Central. Congo Free State: banks of the Congo at Lukolela, 950 ft., *Hens*, C, 147 ! and at Lisha, 950 ft., *Hens*, C, 150 ! Mzona, *Descamps !*

Mozamb. Dist. German East Africa: Kilimanjaro, *Taylor !* Karagwe; Bukoba, *Stuhlmann*, 3706 ! Portuguese East Africa: Mozambique, *Peters !* British Central Africa: Nyasaland; between Mpata and the commencement of the Tanganyika Plateau, 2000–3000 ft., *Whyte*, near Nsessi River, *Scott !* near Umbaka River, *Scott !* and without precise locality, *Buchanan*, 1300 ! 1323 ! Boruma, on the Zambesi, *Menyharth*, 104D !

Also in the Mascarene Islands.

This species is known from *C. longus*, Linn., and *C. rotundus*, Linn., by the narrower spikelets with exactly parallel sides. The stem being suberect and bulbous at the base distinguishes it further from *C. longus*. In the cases (*C. Baikiei*, C. B. Clarke formerly) where the bulb is large and very woody, no stolons are seen: when the solitary stems spring from a creeping root, the basal bulb is usually much less marked.

98. **C. congensis,** *C. B. Clarke.* Glabrous. Stems erect, 8–12 in. long, rather stout, at the base thickened into woody bulbs, at the top round-trigonous. Leaves often longer than the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Umbel simple, contracted; rays 3–6, 0–$\frac{3}{4}$ in. long; bracts 4–6, often 6–14 in. long. Spikelets densely clustered, dusky-brown, 1 by $\frac{1}{16}$–$\frac{1}{12}$ in., 30-flowered; rhachilla scarcely winged. Glumes loosely spreading, obtuse; margins scarious. Style hardly any; branches 3, long. Nut $\frac{2}{3}$ the length of the glume, oblong, pyramidal at each end, trigonous, brown.

South Central. Congo Free State: Bussindi, 1000 ft., *Hens,* 391 !

99. **C. Heudelotii,** *C. B. Clarke.* Glabrous. The stolons harden into a rhizome $\frac{1}{5}$ in. thick. Stems 8–12 in. long, slender, their bases $\frac{1}{3}$ in. in diam., globose, woody. Leaves nearly as long as the stem, hardly $\frac{1}{16}$ in. broad, the margins in the dried examples inrolled. Umbel almost contracted into a head, 1 in. in diam., of 30 spikelets; bracts 3, the lowest suberect, 4 in. long. Spikelets nearly $\frac{1}{2}$ by $\frac{1}{16}$ in., flattened, pallid, 12–18-flowered; rhachilla not winged. Style 3-fid; immature nut acutely triquetrous.

Upper Guinea. Senegal, *Heudelot !* (in herb. Delessert).

100. **C. rotundus,** *Linn. Sp. Pl. ed. 2, 67, not of Linn. herb.* Glabrous. Rhizome woody, creeping, with tuberous thickenings. Stems 8–24 in. long, at the top trigonous and smooth, at the base more or less bulbous. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{6}$–$\frac{1}{4}$ in. broad. Umbel 1–8 in. in diam., compound or simple; bracts 3–4, overtopping the umbel. Spikelets loosely spicate, ferruginous-red or chestnut-red (but see var. *spadicea*), $\frac{2}{3}$–1 by $\frac{1}{16}$–$\frac{1}{12}$ in., 8–30-flowered (or in Tropical Africa a large form occurs with spikelets up to 2 in. long, 50–60-flowered, very bright-coloured), compressed; wings of rhachilla conspicuous, hyaline, continued up the lower margins of the glumes, at length deciduous. Glumes approximate, boat-shaped, ovate, pointed, 1–3 nerves forming the yellow keel, not spreading in dried examples, not striated on the sides. Stamens 3; connective of anthers very little produced. Nut $\frac{1}{2}$ the length of the glume, trigonous, obovoid, dark-brown; style shorter than the nut; branches 3, linear, longish.—Kunth, Enum. ii. 58 (excl. *C. bulbosus*, Vahl, and some other syn.); Boeck. in Linnæa, xxxvi. 283, and in Flora, 1879, 554; Coss. & Durieu, Expl. Scient. Algér. Glum. 247; Benth. in Hook. Niger Fl. 550; Schweinf. Pl. Nilot. 42, Beitr. Fl. Aethiop. 215, and in Bull. Herb. Boiss. ii. Append. ii. 49; Oliver in Trans. Linn. Soc. xxix. 165; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 614, in Durand & Schinz, Conspect. Fl. Afr. v. 574,

and in Dyer, Fl. Cap. vii. 182; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 138; Ficalho & Hiern in Trans. Linn. Soc. ser. 2, Bot. ii. 27; Henriques in Bolet. Soc. Brot. v. 208; Engl. Hochgebirgsfl. Trop. Afr. 142; Durand & Schinz, Études Fl. Congo, i. 292; K. Schum. in Engl. Pfl. Ost-Afr. 120; Durand & De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 89; Urban, Symb. Antill. ii. 34; Rendle, Cat. Afr. Pl. Welw. ii. 116. *C. hexastachyos*, Rottb. Descr. et Ic. 28, t. 14, fig. 2. *C. tetrastachyos*, Desfont. Fl. Atlant. i. 45, t. 8. *C. esculentus*, Desfont. Fl. Atlant. i. 43; Zarb in Cat. Spéc. Bot. Pfund, 39, not of Linn. *C. stoloniferus*, var. *pallidus*, Boeck. in Linnæa, xxxv. 490, not of Retz. *C. proteinolepis*, Boeck. in Flora, 1879, 549, not of Steud. *C. longus*, Boeck. in Journ. Linn. Soc. xviii. 104; Zarb in Cat. Spéc. Bot. Pfund, 39, not of Linn.

Upper Guinea. Cape Verd Islands, *Bolle!* *Cardoso*, 192! *Lowe!* Senegal, *Roger*, 70! *Lécard*, 130! Senegambia, *Heudelot*, 523! 545! Galam, *Heudelot*, 315! 390! Sierra Leone, *Vogel*, 76! Niger Territory: River Niger, *Vogel*, 62! Nupe, *Barter*, 853!

Nile Land. Red Sea, *Lord!* Nubia: near Abu-Gerad, *Kotschy*, 28! Wady Laemeb, *Schweinfurth*, ser. iii. 188! Wady O-Mareg, *Schweinfurth*, 405! at the 6th cataract of the Nile, *Schweinfurth*, 470! Wady Arab, *Schweinfurth*, 500! Egedeh, *Schweinfurth*, 530! Ben Naga, *Schweinfurth*, 754! between Berber and Khartoom, *Schweinfurth*, 525! 614! Khartoom, *Petherick!* White Nile, at Wod Schellai, *Schweinfurth*, 945! Sennar; banks of the Nile, *Kotschy*, 351! Ethiopia, *Kotschy*, 190! Kordofan: Debach, *Pfund*, 493! Obeid, *Pfund*, 30! 628! Abou Haraza, *Pfund*, 123! and without precise locality, *Pfund*, 615! 624! Gallabat: region of Matamma, *Schweinfurth*, 2026! Eritrea: Marhabe Valley, 6500 ft., *Schweinfurth*, 1350! Keren, *Steudner*, 903! Abyssinia, *Hildebrandt*, 364 partly! British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 1822! Lake Losuguta, *Gregory*, 53! Kamasia, *Gregory*, 63! Mwachi River, *Gregory*, 3! Sabaki River, *Gregory*, 11! Ribe, near Mombasa, *Wakefield!*

Lower Guinea. Princes Island, *Mann*, 3487! Island of St. Thomas, *Moller in Fl. Afr. Exsicc. Conimbric*, 119! Lower Congo, 700 ft., *Hens*, 244! *Demeuse*, 121! Zambi, *Dupuis!* Angola: by the River Bengo, *Welwitsch*, 7023! Loanda; Quicuxe, by the lake, *Welwitsch*, 7053! Golungo Alto, in fields, *Welwitsch*, 7102 partly! Benguela, *Anchieta*, 1003!

South Central. Congo Free State, *Dewèvre*, 5! 10!

Mozamb. Dist. Zanzibar, *Taylor!* *Kuntze*, 213! 300! German East Africa: Mafia Island, *Frere!* Usambara; Tanga, *Holst*, 2699! Kilimanjaro, 5000 ft., *Taylor!* Tanganyika region, near the River Malagarazi, *Speke & Grant!* Portuguese East Africa: Lower Zambesi; Shupanga, *Kirk!* Zambesia, *Stewart!* Lower Shire, *Kirk!* British Central Africa: Boruma, on the Zambesi, *Menyharth*, 537! 1066!

A noxious rice-field weed, everywhere.

Var. *laxata*, C. B. Clarke in Journ. Linn. Soc. xxi. 172. A large plant, with a large open umbel. Glumes long, subremote, in fruit hardly imbricate. Nut only $\frac{1}{4}$–$\frac{1}{3}$ the length of the glume.—*C. Rudioi*, Boeck. in Flora, 1882, 12.

Upper Guinea. Island of St. Thomas, *Moller*, 13! 16! Niger, *Marshall!*

Also near Rio Janeiro.

Whether this be esteemed a species, a variety, or a trifling form, the plant of Moller matches very well the Rio Janeiro examples.

Var. *platystachys*, Bojer ex C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 575.

Spikelets large, clustered, suberect.—C. B. Clarke in Dyer, Fl. Cap. vii. 182. *C. tuberosus*, Boeck. in Linnæa, xxxvi. 285 partly (nearly all the African examples). *C. fenzelianus*, K. Schum. in Engl. Pfl. Ost-Afr. C. 120.

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1070! German East Africa: Usambara; Tanga, *Holst*, 2032!

Also in South Africa and the Mascarene Islands.

Var. *spadiceus*, Boeck. in Linnæa, xxxvi. 284. Stem usually tall, often scabrous at the top. Spikelets strongly compressed, shining, hard, chestnut-red or chestnut-black.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 575; Engl. Hochgebirgsfl. Trop. Afr. 142. *C. rotundus*, Hochst. in Flora, 1841, i. Intell. 20; A. Rich. Tent. Fl. Abyss. ii. 482; Oliver in Trans. Linn. Soc. ser. 2, Bot. ii. 353, forma an *C. adoensis*?

Nile Land. Kordofan, *Pfund!* Abyssinia: Wojerat Province, *Petit!* near Adowa, *Schimper*, 370! Jemla, *Steudner*, 213! Begemeder Province, *Schimper*, 546! 1291! 1322! 1379! 1555! British East Africa: Ruwenzori 5300 ft., *Scott-Elliot*, 7590! Kamasia, *Gregory*, 63! Taita; Ndi Mountain, 5300 ft., *Scott-Elliot*, 6259!

Mozamb. Dist. Zanzibar, *Taylor!* German East Africa: Usambara; Kwa Mshuza, *Holst*, 9024! Karagwe, *Stuhlmann*, 1751! British Central Africa Nyasaland; Mount Zomba, 4000–6000 ft., *Whyte!*

101. **C. longus,** *Linn. Sp. Pl. ed.* 2, 67, *not herb. Linn.* Rhizome stout, creeping. Stem at the base oblique or decumbent, not much thickened, with a contraction under the bulb into the rhizome (as usual in *C. rotundus*). Umbel compound, straggling, otherwise nearly as *C. rotundus*.—Kunth, Enum. ii. 60; Boeck. in Linnæa, xxxvi. 279, excl. var. β, ε, ζ, η; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 614, in Durand & Schinz, Conspect. Fl. Afr. v. 567, in Bull. Herb. Boiss. iv. Append. iii. 30, and in Dyer, Fl. Cap. vii. 182; K. Schum. in Engl. Pfl. Ost-Afr. C. 120.

Throughout Tropical Africa (ex *K. Schumann*, l.c.).

Also in Europe, North Africa, Central Asia.

Var. *tenuiflorus*, Boeck. in Linnæa, xxxvi. 281. Rays of the umbel less unequal. Spikes denser. Spikelets neater, more deeply coloured, often brown or almost chestnut.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 567; Boeck. in Engl. Gazelle Reise, Bot. 15; Rendle in Cat. Afr. Pl. Welw. ii. 116. *C. tenuiflorus*, Rottb. Desc. et Ic. 30, t. 14, fig. 1. *C. badius*, Desfont. Fl. Atlant. i. 45, t. 7, fig. 2. *C. Volkensii*, K. Schum. in Volkens, Exsicc. 1675.

Lower Guinea. Lower Congo: Ponta da Lenha (ex *Boeckeler*). Angola: Mossamedes; borders of sugar plantations, *Welwitsch*, 6886! Huilla; Humpata, *Newton*, 23!

Mozamb. Dist. German East Africa: Kilimanjaro; Maduhama, 3300 ft., *Volkens*, 1675! British Central Africa: Boruma, on the Zambesi, *Menyharth*, 519! 1067!

Plentiful in Europe, North Africa and Extra-tropical South Africa.

There is no example at Kew from Tropical Africa which is referred to *Cyp. longus*, Linn., or any variety of it; and I have only seen 3 examples from Tropical Africa which I refer to the var. *tenuiflora*. As K. Schumann finds *C. longus* in a great number of "areas" of Tropical Africa, I infer that he places in *C. longus* many plants which I have placed elsewhere. The series of species from *C. rotundus* down to *C. tuberosus* are too close together.

102. **C. nuerensis,** *Boeck. in Flora*, 1879, 555. Glabrous. Stem 18 in. long, rather stout, at the top trigonous and smooth. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{3}$ in. broad. Umbel compound, 6 in. in diam.; bracts 5–6, similar to the leaves, lowest 5 in. long. Spikes numerous, of 5–8 spikelets. Spikelets $\frac{2}{5}$ by $\frac{1}{16}$ in., compressed, highly coloured, rigid, 30-flowered; wings of the rhachilla very narrow. Glumes oblong, boat-shaped, obtuse, brown with a green keel, approximate on the rhachilla. Nut $\frac{1}{2}$–$\frac{2}{3}$ the length of the glume, broad-oblong, brown. Style $\frac{2}{3}$ the length of the nut; branches 3, as long as the undivided part of the style. *C. neuerensis*—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 570.

Nile Land. British East Africa: Gazelle River, at the Nuer Villages, *Schweinfurth*, 1172!

Rhizome not seen.

103. **C. rigidifolius,** *Steud. in Flora*, 1842, 593. Glabrous. Stolons hardening into rhizomes 8 in. long, $\frac{1}{8}$ in. in diam. Stems 8–20 in. long, rather stout, at the base not or slightly bulbous, at the top trigonous and smooth. Leaves $\frac{1}{2}$–$\frac{2}{3}$ the length of the stem, $\frac{1}{8}$–$\frac{1}{4}$ in. broad. Umbel 6–8 in. in diam. or often less (sometimes reduced to a head); primary rays 3–7, the secondary rays at the head of each corymbose and contracted nearly into a head; bracts 3–5, similar to the leaves, overtopping the umbel. Spikes of 3–5 chestnut-brown or nearly black spikelets. Spikelets $\frac{2}{5}$ by $\frac{1}{12}$ in., compressed, rigid, 8–16-flowered, suberect; wings of rhachilla ovate-lanceolate, prominent. Glumes obtuse, on the back 5-nerved, yellow-green, on the sides nearly nerveless reddish-black; otherwise nearly as *C. rotundus*.—Steud. Syn. Pl. Glum. ii. 30; A. Rich. Tent. Fl. Abyss. ii. 486; Boeck. in Linnæa, xxxv. 528; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 573; K. Schum. in Engl. Pfl. Ost-Afr. C. 118. *C. adoensis*, Hochst. in Flora, 1841, i. Intell. 20, name only; A. Rich. Tent. Fl. Abyss. ii. 484. *C. longus*, var. *adoensis*, Boeck. in Linnæa, xxxvi. 281; Engl. Hochgebirgsfl. Trop. Afr. 142. *C. atrosanguineus*, Hochst. ex Steud. Syn. Pl. Glum. ii. 30; Boeck. in Linnæa, xxxv. 527; Engl. Hochgebirgsfl. Trop. Afr. 140.

Nile Land. Abyssinia: near Adowa, *Schimper*, 186! near Enjedcap, *Schimper*, 991! near Magdala, *Steudner*, 901! Begemeder; Jan Meda, *Schimper*, 1290! Gafat, *Schimper*, 1247! and without precise locality, *Schimper*, 229! British East Africa: marshes by Lake Nakuro, *Scott-Elliot*, 6842! Mpororo district, *Scott-Elliot*, 8042! Ndoro, on Mount Kenia, *Gregory*, 78!

Mozamb. Dist. German East Africa: Kilimanjaro, 5000–6000 ft., *Volkens*, 662! 1397! 1467! *Taylor!* Kanesse, west of Lake Victoria, *Stuhlmann*, 940!

104. **C. Taylori,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 578. Woody rhizome long, bearing tubers. Stem 2–2½ ft. long, covered $\frac{1}{3}$ its length by sheaths. Leaves as long as the stem, $\frac{1}{5}$ in. broad. Umbel contracted into a dense compound head 1–2½ in. in diam.; bracts up to 1 ft. long. Spikelets 1 by $\frac{1}{10}$ in., resembling those of large examples of *C. rotundus*. Nut $\frac{1}{4}$ the length of the glume,

obovoid; otherwise as *C. rotundus*.—K. Schum. in Engl. Pfl. Ost-Afr. C. 121.

Nile Land. British East Africa: Rabai Hills, near Mombasa, *Taylor!*

This is very near *C. rotundus*; the broad nut differs, also the very long flaccid leaves.

105. **C. fenzelianus,** *Steud. Syn. Pl. Glum.* ii. 33. Tall. Stolons long, thick. Leaves and bracts long. Umbel open. Spikelets white or straw-coloured, becoming in age dusky straw-coloured, with very little or no red about them; otherwise as *C. rotundus*.—Boeck. in Linnæa, xxxvi. 297; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 615, and in Durand & Schinz, Conspect. Fl. Afr. v. 562. *C. pallescens*, Boiss. Fl. Orient. v. 376; Aschers. & Schweinf. Ill. Fl. Égypte, 157, not of Desfont. *C. ochreoides*, Steud. Syn. Pl. Glum. ii. 34. *C. tenuiflorus*, Balf. f. in Trans. Roy. Soc. Edin. xxxi. 305, not of Rottb. *C. longus*, var. *pallidus*, Boeck. in Linnæa, xxxvi. 280 excl. syn. *C. mitis*, not of Boiss. *C. longus*, var. *pallescens*, C. B. Clarke in Journ. Linn. Soc. xxi. 164. *C. rotundus*, Boeck. in Flora, 1879, 554. *C. lamarckianus ?*, Hochst. in Kotschy, Exsicc. 222, not of Schultz. *C. olivaceus*, Fenzl ex Steudel, l.c. *C. Volkensii*, K. Schum. in Volkens, Exsicc. 1675.

Upper Guinea. Senegal: at Lake Guier, *Roger!* Richard Toll, *Dollinger*, 22! Cameroons: Bipindi, *Zenker*, 898!

Nile Land. Nubia: Sedab, between Berber and Khartoom, *Schweinfurth*, 525! Sennar, *Kotschy*, 171! Kordofan: around ponds at Kohn Mountain, *Kotschy*, 222! and without precise locality, *Pfund*, 608! Somaliland, 700–2500 ft., *Teleki!* British East Africa: Witu; *Gregory!*

Mozamb. Dist. German East Africa: Usambara, *Holst*, 2032! Karagwe; Kafuro, 4500 ft., *Stuhlmann*, 1839! 1889! Kagera River, *Stuhlmann*, 1949! River Sanju, 3000–3500 ft., *Volkens*, 1675!

Also in North Africa, Arabia, Persia and India.

This species is hardly distinguishable from *C. rotundus* but by its large size, flaccid habit, and absence of red in the spikelets.

106. **C. fissus,** *Steud. in Flora*, 1842, 593. Stems about 6 in. long. Umbel contracted nearly into a head, of few spikelets. Connective of the anthers produced in a narrow triangle, so that the anthers may be called crested; otherwise as *C. rotundus*.—Steud. Syn. Pl. Glum. ii. 30; A. Rich. Tent. Fl. Abyss. ii. 487; Boeck. in Linnæa, xxxv. 526; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 562; Engl. Hochgebirgsfl. Trop. Afr. 140.

Nile Land. Abyssinia: Samen; in mountain meadows at Gessgessa, *Schimper*, 992! and without precise locality, *Quartin-Dillon & Petit!* British East Africa: Sabaki River, *Gregory*, 102!

This is another species separated on slight grounds (the cresting of the connective) from *C. rotundus*. The 3 collections known all agree, however, in the small size, contracted umbel, and strongly-coloured spikelets.

107. **C. tuberosus,** *Rottb. Descr. et Ic.* 28, *t.* 7, *fig.* 1. A large plant, with large open umbel. Rays of umbel slender (in the

form *tenuiflora*, Roxb., very slender). Spikelets linear. Glumes in fruit obliquely spreading; otherwise as *C. rotundus*, Linn.—Kunth, Enum. ii. 50 (only in small part); Boeck. in Linnæa, xxxvi. 285 partly; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 616, and in Durand & Schinz, Conspect. Fl. Afr. v. 580; Durand & Schinz, Études Fl. Congo, i. 294.

Upper Guinea. Senegal, *Adanson*, 164A !

Lower Guinea. Lower Congo: in the Manioc fields at Stanley Pool, 950 ft., *Hens*, B, 21 !

South Central. Congo Free State, *Demeuse !*

Also in the Mascarene Islands, India, Formosa and Australia. In the large forms of *C. rotundus* the plant is usually rigid, the primary rays of the umbel stout.

108. **C. ibeensis,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 120. Glabrous. Stems 7, densely tufted, 2 ft. high, very slender, thickened at the base by long dusky withered leaf-sheaths; a thick mass of roots, but no stolon present. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{20}$ in. broad. Umbel simple; rays 3–5, up to 1–1$\frac{1}{2}$ in. long; bracts 3–4, similar to the leaves, lowest up to 8 in. long. Spikes of 5–17 spikelets. Spikelets $\frac{3}{5}$ by $\frac{1}{16}$ in., compressed, a fine red, 20–40-flowered; rhachilla quadrangular, wings narrow oblong. Glumes densely packed, ovate, obtuse, 5-nerved, 1-coloured, i.e. red, hardly greenish on the keel, regularly deciduous from the lowest upwards Stamens 3; anthers linear-oblong, muticous. Style rather shorter than the nut; branches 3, long. Nut $\frac{1}{2}$ the length of the glume, obovoid, trigonous, smooth, brown.

Nile Land. British East Africa: Uganda, *Wilson*, 751 ! Ukamba; Kitui, *Hildebrandt*, 2657 ! Shimba Mountains, near Mombasa, *Taylor !*

This species is very unlike any other, nor can I guess its true affinity. I formerly arranged it with the Section *Tunicatæ;* but, if it should prove to have evanescent stolons producing bulbils, the spikelets will be different from those in any of the *Tunicatæ.*

109. **C. radiatus,** *Vahl, Enum.* ii. 369. Glabrous. Rhizome 0; lateral shoots are sometimes formed at the base of the stem, flowering the second year. Stem, when fairly developed, 1–2 ft. long, but small examples 6–8 in. are frequent, examples only 1 in. long have occurred. Leaves $\frac{2}{3}$ the length of the stem, up to $\frac{2}{5}$ in. broad. Umbel in well-developed examples 6–10 in. in diam., but in African examples often contracted, sometimes into one dense head; bracts similar to the leaves, much overtopping the inflorescence. Spikes digitate, their pedicels hardly exceeding $\frac{1}{8}$ in. in length, dense, cylindric, with suberect or spreading spikelets, 1 by $\frac{1}{3}$–$\frac{2}{3}$ in. Spikelets $\frac{1}{5}$–$\frac{2}{5}$ by $\frac{1}{20}$ in., 10–36-flowered, strongly compressed, pallid or finally brownish, not or rarely highly coloured red or yellow; wings of the rhachilla oblong, persistent, hyaline. Glumes ovate, usually apiculate, very closely placed on the rhachilla and (even in fruit) tightly imbricate. Stamens 3; anthers small, muticous. Nut $\frac{2}{5}$–$\frac{1}{2}$ the length of the glume, ovoid or wide-ellipsoid, acutely trigonous, pyramidal at the base and top, finally

ashy-black. Style ½ the length of the nut; branches 3, linear, small. —Kunth, Enum. ii. 71; Boeck. in Peters, Reise Mossamb. Bot. 542, in Linnæa, xxxvi. 317, and in Flora, 1879, 555; Schweinf. Pl. Nilot. 41, and Beitr. Fl. Aethiop. 215; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 617, and in Durand & Schinz, Conspect. Fl. Afr. v. 573; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 142; K. Schum. in Engl. Pfl. Ost-Afr. C. 121; Durand & Schinz, Études Fl. Congo, i. 292; Urban, Symb. Antill. ii. 23, 35; Rendle in Cat. Afr. Pl. Welw. ii. 119. *C. biceps*, Vahl, Enum. ii. 368. *C. semidives*, Steud. Syn. Pl. Glum. ii. 36.

Upper Guinea. Senegal, *Sieber!* *Lelièvre!* Senegambia, *Heudelot*, 522! Galam, *Heudelot*, 211! Gambia, *Mungo Park!* Niger Territory: River Niger, *Baikie!* Nupe, *Barter*, 1127! Lukuja, at the Confluence of the Niger and Benue Rivers, *Dalton!* Bornu, Oudney, 6! Cameroons, *Buchholz!*

Nile Land. Nubia: Dongola, *Ehrenberg!* Ethiopia, *Kotschy*, 416! Sennar, *Kotschy*, 213! *Hartmann!* British East Africa: White Nile; *Petherick!* Bongo; Addai, *Schweinfurth*, 1428! Jur; Jur Ghattas, *Schweinfurth*, 1579! Wau River, *Schweinfurth*, 1631!

Lower Guinea. Lower Congo: among the rocks of the rapids of Ntamo, Stanley Pool, *Hens*, B, 11! *Luja*, 68! and without precise locality, *Smith!* Angola: Icolo e Bengo; banks of a lake near Folo, *Welwitsch*, 7030! Barra do Dande; by a lake near Bombo, *Welwitsch*, 7036!

South Central. Congo Free State: Lusambo, *Duchesne*, 19! Monbuttu; Kibali River, *Schweinfurth*, 3571!

Mozamb. Dist. Portuguese East Africa: Mozambique, *Peters*, 8! Lower Zambesi, *Stewart*, Expedition Island, *Kirk!* British Central Africa: Nyasaland; Elephant marsh in the Shire Valley, below Mbewe, *Scott!* Umbaku River, *Scott!*

Widely diffused in Madagascar, South-east Asia and Tropical America.

110. **C. exaltatus,** *Retz. Obs.* v. 11. Stems often 3–4 ft. high. Spikes (some of them) peduncled. Spikelets rather larger, in longer spikes, less crowded (but see var. *dives*), more strongly coloured, often yellowish or reddish; otherwise as *C. radiatus*, Vahl.—Kunth, Enum. ii. 70; Benth. in Hook. Niger Fl. 551; Boeck. in Linnæa, xxxvi. 319; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 617, and in Durand & Schinz, Conspect. Fl. Afr. v. 560; K. Schum. in Engl. Pfl. Ost-Afr. C. 121. *C. racemosus*, Boeck. in Flora, 1879, 555, not of Boeck. in Linnæa, xxxvi. 310. *C. ornithopioides*, Zarb in Cat. Spéc. Bot. Pfund, 39.

Nile Land. Kordofan: Sagattur, *Pfund*, 228! 611! British East Africa: Jur; Kurshook Ali's Seriba, *Schweinfurth*, 1764! Ribe, near Mombasa, *Wakefield!*

Lower Guinea. Island of St. Thomas, *Don!*

Abundant in South-east Asia and Australia. Also in the Mascarene Islands, Mexico and Brazil.

This species is hardly distinguishable from well-developed examples of *C. radiatus*. The line is drawn here by defining *C. radiatus* as having *all* the spikes sessile.

Var. *dives*, C. B. Clarke in Journ. Linn. Soc. xxi. 187. Umbel rigid. Spikes rigid, dense. Ripe spikelets divaricate or reflexed, hard, often shining and yellowish.

—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 617, and in Durand & Schinz, Conspect. Fl. Afr. v. 561 ; Rendle in Cat. Afr. Pl. Welw. ii. 119. *C. dives*, Delile, Fl. Égypte, 5, t. 4, fig. 3; Kunth, Enum. ii. 71; Hochst. in Flora, 1841, i. Intell. 20; Steud. in Flora, 1842, 595; A. Rich. Tent. Fl. Abyss. ii. 480; C. B. Clarke in Journ. Linn. Soc. xx. 293; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 142. *C. alopecuroides*, Presl in Oken, Isis, xxi. (1828) 271; Boeck. in Linnæa, xxxvi. 322 (var. *a* only); Oliver in Trans. Linn. Soc. xxix. 166; Volk. Kilimand. 28; Engl. Hochgebirgsfl. Trop. Afr. 143; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 49, not of Rottb; K. Schum. in Engl. Pfl. Ost-Afr. C. 121.

Upper Guinea. Cape Verd; *Perrottet.*

Nile Land. Eritrea: Goura, 6800 ft., *Schweinfurth & Riva*, 920! Abyssinia: Tigre; streams near Adowa, *Quartin-Dillon & Petit! Schimper*, 30! Modat; by streams in Aguar Valley, *Schimper*, 1101! and without precise locality, *Schimper*, 136! 547! British East Africa: Niamniam; Nabambisso River, *Schweinfurth*, 3727! Ruwenzori; Semliki Valley, *Scott-Elliot*, 8052! Buddu, *Stuhlmann*, 1187! Lake Baringo, *Gregory*, 57! Kangaga, *Taylor*, 32! Ukamba; Kiboko, in marshy rivers, *Scott-Elliot*, 2333!

Lower Guinea. Angola: Golungo Alto; by streams near Sange, *Welwitsch*, 7091! Pungo Andongo; in marshy places between Condo and Quisonde, *Welwitsch*, 6939!

South Central. Congo Free State; *Dewèvre*, 10,039!

Mozamb. Dist. German East Africa: Karagwe; Little Lake Windermere, *Speke & Grant*, 480! Kilimanjaro, *Taylor!* Usambara; Muanamata, 2000 ft., *Volkens*, 2377! Portuguese East Africa: Lower Valley of the River Shire, *Meller!* British Central Africa: Nyasaland; Elephant Marsh, in the Shire Valley, *Kirk! Scott!* Lake Nyasa, *Scott-Elliot*, 8414! and without precise locality, *Buchanan*, 865! Zambesi Valley; Boruma, *Menyharth*, 1058.

Also in Egypt, Syria, Madagascar and India; but the variety cannot be distinctly separated from the species (*exaltatus* itself), therefore neither can its area of distribution.

111. **C. Pethericki,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 571. Very tall and stout (only the 2 upper feet of stem present). Lowest bract very long, $\frac{2}{3}$ in. broad, very smooth, thick, and tough. Umbel large, compound, with large many-flowered cylindric spikes. Spikelets nearly $\frac{1}{2}$ in. long, 36-flowered, pale yellowish-brown. Glumes thin, not strongly keeled, their margins (in the dried state) much incurved; otherwise as *C. exaltatus*.

Nile Land. British East Africa: banks of the Nile in Denka Territory, *Petherick!*

The softer less-keeled glumes, with incurved margins, cause this plant to simulate *C. alopecuroides*, but the styles are all 3-fid, the nuts all acutely trigonous, and I think it may prove only another variety of *C. exaltatus*.

112. **C. immensus,** *C. B. Clarke in Journ. Linn. Soc.* xx. 294. Stem at the top $\frac{1}{3}$–$\frac{1}{2}$ in. in diam., acutely trigonous. Lowest bract in some examples up to 1 in. wide. Umbel in the type (*Perrottet*, 483) must have exceeded 2 ft. in diam., very dense. Spikelets $\frac{3}{4}$ by $\frac{1}{12}$ in., 40-flowered, much compressed, hard, shining, yellow-brown; wings of the rhachilla falcate, linear-lanceolate, yellow, early caducous. Glumes strongly keeled, strongly mucronate; otherwise as *C. exaltatus*.—C. B.

Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 565, and in Dyer, Fl. Cap. vii. 184. *C. alopecuroides*, var. *α dives*, Boeck. in Linnæa, xxxvi. 321.

South Central. Congo Free State: Katanga, *Verdick!*

Mozamb. Dist. German East Africa: Kilimanjaro, 3000 ft., *Taylor!* Portuguese East Africa: Mozambique, *Zimmermann!*

Also in Madagascar and South Africa.

The type of this species has the compressed tight-packed spikelets of the *C. exaltatus* group, but the yellow deciduous rhachilla-wings of the *C. digitatus* group (these wings running up the margins of the glumes). Apart from the style being 3-fid, the structure appears to me remote from that of *C. alopecuroides*. The African examples agree well with the Madagascar, but have shorter spikelets.

Var. *Taylori*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 565. Primary rays of umbel 12 in. long, secondary 4 in. long. Spikes 2–2½ in. long, dense, but not rigid. Spikelets obliquely erect, 12–18-flowered; wings of rhachilla very narrow. Nut ¼ the length of the glume, obovoid.

Nile Land. British East Africa: Rabai Hills, near Mombasa, *Taylor!*

Mozamb. Dist. Zanzibar, *Taylor!*

This variety should perhaps rather be appended to *C. exaltatus*.

113. **C. digitatus,** *Roxb. Hort. Beng.* 81. Glabrous. Stem 2–6 ft. long, at the top triquetrous, smooth. Leaves ⅔ the length of the stem, ¼ in. broad. Umbel 8–24 in. in diam., compound; bracts similar to the leaves, lowest exceeding the umbel. Spikes 2 by 1 in., with very many spikelets spreading at right angles. Spikelets ⅓–½ by $\frac{1}{24}$ in., 20-flowered, not much compressed, yellowish-brown; wings of the rhachilla lanceolate, yellow, very caducous. Glumes ovate, scarcely mucronate, the back 3–5-nerved, greenish-brown, the sides yellow without striations. Stamens 3; anthers linear-oblong, not crested. Nut ½ the length of the glume, trigonous, oblong-ellipsoid, often somewhat curved, finally black. Style rather shorter than the nut; branches 3, linear.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 618, and in Durand & Schinz, Conspect. Fl. Afr. v. 558; Urban, Symb. Antill. ii. 36. *C. venustus*, Nees in Flora, 1828, 333; Kunth, Enum. ii. 68 partly; Boeck. in Linnæa, xxxvi. 316 partly, not of R. Br. *C. Neesii*, Kunth, Enum. ii. 101 (excl. syn. Linn.); Boeck. in Linnæa, xxxvi. 315. *Papyrus venustus*, Nees in Linnæa, x. 138 partly.

Nile Land. Niamniam, *Schweinfurth*, 3717A!

Also in Madagascar, South-eastern Asia, Australia, and throughout the warmer parts of America.

114. **C. grandis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 564. Very large; stem at the top ⅓ in. in diam., trigonous. Lowest bract 1⅓ in. broad, very thick, leathery. Primary rays of umbel 10 in. long, thick; secondary up to 4 in. long. Spikes 2 by 1 in. Spikelets very numerous, spreading or deflexed in fruit, like those of *C. digitatus*, but rather longer, terete; otherwise as *C. digitatus*, Roxb. —K. Schum. in Engl. Pfl. Ost-Afr. C. 121.

Nile Land. British East Africa: Rabai Hills, near Mombasa, *Taylor!*

Mozamb. Dist. Zanzibar, *Kirk! Hildebrandt*, 1073!

This may be an extreme form of *C. digitatus*, Roxb., but no example of this widespread species comes near it in size; the rays of the umbel in *C. grandis* are $\frac{1}{6}$—$\frac{1}{5}$ in. in diam.

115. **C. auricomus,** *Sieber ex Spreng. Syst.* i. 230. Stem at the top triquetrous with concave faces, or almost 3-winged, otherwise as *C. digitatus*, Roxb.—Boiss. Fl. Orient. v. 373; Boeck. in Flora, 1879, 555; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 142; C. B. Clarke in Journ. Linn. Soc. xxi. 188 partly, and in Durand & Schinz, Conspect. Fl. Afr. v. 549; K. Schum. in Engl. Pfl. Ost-Afr. C. 121; Durand & Schinz, Études Fl. Congo, i. 284; Rendle in Cat. Afr. Pl. Welw. ii. 118; not of F. Muell. *C. ornithopodioides*, Delile, Fl. Ægypt. Ill. ii. (1812) 50, name only. *C. auricomus*, var. *subalatus*, Aschers. & Schweinf. Ill. Fl. Égypte, 156. *C. xanthocomus*, Link, Hort. Berol. i. 316 (cfr. ii. 320). *C. Wiestii*, Steud. Syn. Pl. Glum. ii. 35. *C. venustus*, Presl in Oken, Isis, xxi. (1828) 271; Kunth, Enum. ii. 68 partly; Boeck. in Linnæa, xxxvi. 316 partly. *C. subalatus*, Boeck. in Linnæa, xxxvi. 291, not of Steud. *C. rhaphiostachys*, and *C. racemosus*, Boeck. in Peters, Reise Mossamb. Bot. 541. *C. aureorufus*, Boeck. in Linnæa, xxxviii. 369; Engl. Hochgebirgsfl. Trop. Afr. 143.

Upper Guinea. Senegal, *Sieber*, 3! *Roger*, 67! *Afzelius!* Senegambia, *Heudelot*, 322! 500! Dahomey, *Newton*, 8! 9! Niger Territory: Nupe, *Barter*, 1565!

Nile Land. Kordofan, *Pfund*, 411! 463! 633! Abyssinia: Shireh Province, *Petit!* Begemeder Province, *Schimper*, 709! 1403! British East Africa: Bongo; Addai, *Schweinfurth*, 1427! Kitch; banks of the Nile at Gaba Shambe, 1192 ft., *Petherick!*

Lower Guinea. Angola: Huilla; swamps by the Mupanda River, *Welwitsch*, 6870! Barra do Dande; banks of the River Dande, *Welwitsch*, 7042! Loanda; marshes and ponds near Boa Vista, *Welwitsch*, 7043! Barra do Bengo; marshy places by Lake Quifandongo, *Welwitsch*, 7080!

Mozamb. Dist. Portuguese East Africa: Zambesi, *Peters*, 8! British Central Africa: Boruma, on the Zambesi, *Menyharth*, 1059!

Common in Egypt.

This species is very near *C. digitatus*, Roxb., and is distinguished primarily by its acutely triquetrous stem; the umbel smaller, slenderer, with usually very unequal rays. The colour varies from straw-colour (at low levels) through yellow to a golden-brown (at high levels)—the *C. aureorufus* of Boeckeler; but there is no red or chestnut-red in the material referred above to this species. At least, this is the view of the colouration here accepted; the copious synonymy above cited shows that competent cyperologists have estimated the colour as of specific value.

Var. *minor*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 550. Slender. Umbel small. Spikelets slender, chestnut-red.—*C. rotundus*, Aschers. & Schweinf. Ill. Fl. Égypte, 157 partly.

Nile Land. Galabat: region of Matamma, *Schweinfurth*, 2025! British East Africa: Kitch; banks of the Nile at Gaba Shimbe, *Petherick*, 25!

Schweinfurth, 2025, was the type of this variety, and should perhaps be referred to *C. longus*, var. *tenuiflora*, of which it has the rhizome and chestnut-red spikelets; but the spikelets are too slender for *C. longus* or *C. rotundus*, and the wings of the

rhachilla are yellow and caducous. These wings in *C. rotundus* and *C. longus* are sometimes rather early caducous and discoloured; still not so much so as in Schweinfurth, 2025, which may indicate a new species.

116. **C. Papyrus,** *Linn. Sp. Pl.* ed. 2, 70. Glabrous. Rhizome woody. Stems subsolitary, 8–15 ft. high, at the base suberect, at the top trigonous or acutely triquetrous or nearly terete. Leaves to the flowering stem 0, i.e. the basal sheaths are shortly produced, discoloured, with hardly any green termination; but green leaves up to 1 by $\frac{1}{3}$ in. are formed on the barren shoots. Primary rays of the umbel often 30, up to a foot long; bracts up to $3\frac{1}{2}$ by $\frac{1}{2}$ in., lanceolate, discoloured with no green termination. Spikes 1 by $\frac{1}{2}$ in., with 20–30 spreading spikelets. Spikelets $\frac{1}{3}$ by $\frac{1}{24}$ in., nearly terete, 6–15-flowered, passing from dusky straw-colour into brown. Glumes broadly elliptic, hardly keeled, obtuse, often emarginate with a very minute mucro, deciduous, rhachilla slender; wings lanceolate, yellow, early falling with the glumes. Stamens 3; anthers linear-oblong, the connective bearing a crest $\frac{1}{6}$–$\frac{1}{3}$ the length of the anther. Nut $\frac{1}{2}$–$\frac{3}{5}$ the length of the glume, ellipsoid, subequally trigonous, ashy-black. Style $\frac{1}{2}$ the length of the nut, slender; branches 3, linear, small.—Benth. in Hook. Niger, Fl. 551; Parl. Mém. Papyrus, 32, t. 2, in Mém. Sav. Étrang. St. Pétersb. xii. (1854) 501 (cfr. Parl. in Comptes-rendus Acad. Paris, xxxv. (1852) 211–217); Boeck. in Linnæa, xxxvi. 303; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 571, and in Bull. Herb. Boiss. iv. Append. iii. 30; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 141; Wydler in Flora, 1864, 609–616, 1865, 40; Rendle in Cat. Afr. Pl. Welw. ii. 118. *C. syriacus,* Parl. Fl. Ital. ii. 43, Mem. Papyrus, 31, and Mém. Sav. Étrang. St. Pétersb. xii. (1854) 501, as to the Sicily plant. *Papyrus Sicula,* Parl. in Hook. Kew Journ. iii. (1851) 189. *P. Antiquorum,* Link, Enum. i. 47; cfr. Haberlandt in Flora, 1878, 175.—Zimmermann, de Papyro; cfr. Flora, 1867, 397.

Upper Guinea. Lagos, *Don! Barter,* 20153! Ogowe, *Buchholz!* Old Calabar, *Robb!*

Lower Guinea. Lower Congo: Kisantu, *Gillet,* 511! Congo, *Smith,* 7! *Curror!* Gaboon: Loango; in a swamp at Ponta Negra, *Soyaux,* 106! Angola: Loanda; ponds of Maghellao near Boa Vista, *Welwitsch,* 7085! Golungo Alto; banks of the River Delamboa, *Welwitsch,* 7104!

South Central. Congo Free State, *Dewèvre,* 414! Lunda: River Lomani, *Pogge,* 1574! River Lulua, *Pogge,* 1585!

Mozamb. Dist. British Central Africa: Nyasaland; Kondowe to Karonga, 2000–6000 ft., *Whyte!*

Also in Sicily.

Var. ? *Antiquorum,* C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 571. Spikelets more or less deciduous above the two lowest (empty) glumes; wings of the rhachilla obtuse, falling very late. Anthers not crested (the connective usually hardly produced at all).—*C. Papyrus,* Linn. Sp. Pl. ed. 2, 70 partly; A. Rich. Tent. Fl. Abyss. ii. 480; Boeck. in Flora, 1879, 555; Boiss. Fl. Orient. v. 374; Oliver in Trans. Linn. Soc. xxix. 165. *C. syriacus,* Parl. Fl. Ital. ii. 43, Mém. Papyrus, 31, t. 1, Mém. Sav. Étrang. St. Pétersb xii. (1854), 501 partly, i.e. as to the Palestine plant. *C. mossambicensis,* Klotzsch in Peters, Reise Mossamb. Bot. 541. *P. Antiquorum,* Willd. in Abhandl. Akad. Berlin, 1812, 70; T. Thoms. in Speke, Nile, Append. 654.

Papyrus mossambicensis, Parl. ex Peters, Reise Mossamb. Bot. t. 59.—*Papyrus*, Bruce, Trav. v. Append. 1–15, t. 1.

Nile Land. White Nile, *Petherick! Brownell! Werne!* British East Africa: Gazelle River, *Schweinfurth*, 1154! Niamniam; at the River Bodumoh, *Schweinfurth*, 3749!

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1193! German East Africa: Karagwe; Bukoba, *Stuhlmann*, 1618! Portuguese East Africa; Mozambique, *Peters!* banks of the River Shire at Shama, *Scott!*

Also in the northern part of the Nile and in Palestine. See Thiselton-Dyer in Gard. Chron. iii. (1875), 78.

This variety forms a transition from *Cyperus* into *Mariscus*, the spikelets showing a distinct tendency to fall off whole from above the two lowest empty glumes.

Imperfectly known species.

117. **C. bulamensis,** *Steud. Syn. Pl. Glum.* ii. 19. Root fibrous. Stem 1½ ft. long, slender. Leaves ½ the length of the stem, slender. Umbel simple; rays 2 in. long. Spikes of 5–9 spikelets. Spikelets scarcely ½ in. long, linear, slender, somewhat compressed. Glumes loosely imbricate, ovate, obtuse, 7–9-nerved, dusky straw-coloured. Nut ⅓ the length of the glume, triquetrous, linear, slender.

Upper Guinea. Portuguese Guinea: Bissagos Islands; Bulama Island.

118. **C. Cadamosti,** *Bolle ex Krause in Engl. Jahrb.* xiv. 400. Cæspitose. Stem 1 ft. high. Leaves rigid, flat, narrow-linear. Bracts 1–2, a little longer than the rays. Spikes sessile, numerous, about 6-flowered. Glumes acute, rufous with hyaline margins.

Upper Guinea. Cape Verd Isles: near Porto Grande; *Krause, Schmidt.*

119. **C. depauperatus,** *Steud. Syn. Pl. Glum.* ii. 34. Rhizome bulbous-woody. Stem 3 ft. high, acutely triquetrous. Leaves up to a foot long, flat, 3-nerved. Bracts 5–6, nearly all of them many times longer than the simple umbel. Rays of umbel 6–18, hardly exceeding 1 in. long. Spikelets aggregated, very short, ovate, 3–5-flowered. Glumes membranous, ovate, obtuse, 7–9-nerved, pale ferruginous. Nut triquetrous, rather obtuse, pale brown.

Nile Land. Abyssinia, *Schimper* (ex *Steudel*).

Steudel inquires, "Is this a variety of *C. ochreoides*, Steud.?" a species reduced above to *C. fenzelianus*, Steud.

120. **C. dilatatus,** *Schumach. & Thonning, Beskr. Guin. Pl.* 38. Root fibrous; stem bearing stolons. Leaves lax. Umbel subcompound; rays elongate; bracts about 5, similar to the leaves. Spikelets alternate, somewhat remote, about 1 in. long with 18 flowers, linear, acute. Glumes lanceolate, concave, obtuse.

Guinea. *Thonning.*

121. **C. flexifolius,** *Boeck. in Flora*, 1879, 549. Root with purple fibres. Stems often 2 together, erect, firm, slender, 10–5 in. high, scarcely $\frac{1}{24}$ in. in diam., triangular, grooved, striate, several-leaved at

the base. Leaves close together, flexuose, much shorter than the stem, rigid, narrow, long acuminate, acute, keeled, 6–3 in. long, at the base about $\frac{1}{12}$ in. broad; margins reflexed and keel acutely toothed. Bracts 4–3, very spreading, 4–1 in. long. Umbel hemispheric, compact, many-rayed, $2\frac{1}{2}$–1 in. in diam., in small specimens reduced to a single head; rays covered with spikelets to the base. Spikelets densely clustered, linear or linear-oblong, compressed, obtuse, $\frac{1}{8}$–$\frac{1}{6}$ by $\frac{1}{16}$ in., 18–40-flowered. Glumes caducous, very minute, densely imbricate, close-pressed, boat-shaped, obovate-rounded, 7-nerved on the back, evidently mucronate below the rounded tip, straw-coloured-rufous, later ferruginous-red, shining. Nut most minute, $\frac{1}{3}$ shorter than the glume, half-glassy, oval, equilateral triangular, minutely punctate, yellow. Style only a little exserted, very slender, 3-fid down to the middle.

Lower Guinea. On an Island at the mouth of the Congo, near Ponta da Lenha, *Naumann*, 143, 150 (ex *Boeckeler*).

Allied to *C. proteinolepis*, Boeck. By *C. proteinolepis*, Boeckeler would mean *C. effusus*, Rottb., above.

122. **C. miquelianus,** *Zarb in Cat. Spéc. Bot. Pfund*, 39, *name only.*

Nile Land. Kordofan: Om Gaseh, *Pfund*, 613 (ex *Zarb*).

123. **C. Muelleri,** *Boeck. in Flora*, 1859, 434 *bis.* Root fibrous, very slender. Stem very slender, erect, somewhat compressed, striated, almost angular (in the smaller example setaceous and subtrigonous), at the base thickened and leaf-bearing. Leaves short, narrow, 2–1 by scarcely $\frac{1}{24}$ in., little recurved, somewhat rigid, long setaceous-acuminate, keel small, margins involute, at the top scabrous-toothed; leaf-sheaths short, dilated, hyaline, membranous, with strong nerves. Umbel simple; rays 6, 3 subequal, 1 in. long, "the rest sessile," each with 4 spikelets (or in the smaller example with 2–1 spikelets); bracts 7, similar to the leaves, the 3 longer as long as the rays. Spikelets spreading, $\frac{1}{3}$ by $\frac{1}{24}$ in., linear, compressed, dusky, at the top a little narrowed, yellow, 40–30-flowered. Glumes approximate, spreading, ovate, keeled (especially upwards), tip emarginate with a short erect or spreading mucro, 3-nerved, yellow, the sides fuscous, the keel prominent, green. Nut very minute, scarcely $\frac{1}{2}$ the length of the glume, round-obovate, triangular, very obtuse, minutely dotted, dusky, terminated by a black point; rhachilla rather thick, flexuose, wingless; style very slender, 3-fid.

Mozamb. Dist. Mozambique, ex *Boeckeler.*

Boeckeler says this species belongs to the Sect. *Aristati*, and is near *C. oligostachyus*, H. B. & K.

124. **C. recurvus,** *Vahl, Enum.* ii. 310. Stems several, 4 in. long and upwards, setaceous, leafy at the base. Leaves as long as the stem, setaceous. Head globose, but little larger than a pea; bracts 3, 1 in.

long, setaceous. Spikelets 10–20, hardly as long as the little finger-nail, linear, narrow, spreading, about 20-flowered. Glumes lax, linear, obtuse, purple, green on the back, aristate; the arista as long as the valve, recurved like a hook, green.

Upper Guinea. Sierra Leone, from the herbarium of *Thouin* or of *Lamarck* (ex *Vahl*). Probably collected by *Afzelius* or *Smeathman*.

Very distinct from *C. aristatus*.

5. **MARISCUS,** Gærtn. Fruct. i. 11, t. 2 (excl. Bobartella).

Spikelet 1–20-flowered, deciduous in one piece by a disarticulation above the two lowest empty glumes; the fertile glumes long-persistent, retaining the nut by the aid of the two wings of the rhachilla. Otherwise as *Cyperus*.—*Cyperus*, Benth. et Hook. f. Gen. Pl. iii. 1043 partly.

Species 180, in all warm and warm-temperate regions; in the New World several species extend to cool-temperate regions.

As subsidiary aids to the rapid discrimination of *Cyperus* from *Mariscus* it should be noted (1) All the leafless examples must be *Cyperus*; (2) All the examples with less than 5 nuts to the spikelet must be *Mariscus*; (3) All the examples with the rhachilla of the spikelet wingless must be *Cyperus*. (Gærtner's first species of *Mariscus*, his Subgenus *Bobartella*, is a *Rynchospora*.)

* Bulbocaulis. Base of the stem thickened by the turgid membranous coloured (often-torn) sheaths.

†Spikelets ripening generally more than 1 nut (usually 2–4, sometimes 6–10 nuts).

‡Inflorescence congested.

Spikes usually condensed into 1 ovoid head (but digitate in *M. dregeanus*, var., and in *M. coloratus*, var.).

Nuts usually 2–4 to the spikelet.

Spikelets straw-coloured or yellow.

Stolons numerous, slender, with red-brown scales . . . . . 3. *M. diurensis*.

Stolons none seen.

Glumes with 9–17 strong ribs.

Spikelets 2–6-nutted.

Spikelets obtuse . . . 1. *M. dregeanus*.

Spikelets acute . . . . 2. *M. coloratus*.

Spikelets 2–1-nutted; glumes remote . . . . . 5. *M. remotus*.

Glumes with few obscure ribs . . 4. *M. firmipes*.

Spikelets chestnut-red . . . . 6. *M. maritimus*.

Nuts usually 6–8–10 to the spikelet.

Spikelets straw-coloured; glumes obtuse . 7. *M. macropus*.

Spikelets chestnut-red; glumes acuminate, acute . . . . . 8. *M. somaliensis*.

Spikes manifestly digitate. (See also *M. dregeanus*, var., *M. coloratus*, var.)

Glabrous.

Spikes green variegated with red . . 9. *M. Schimperi*.

Spikes blackish-green . . . . 10. *M. inflatus*.

Hairy. Spikes cinnamon-straw-coloured . 11. *M. pilosulus.*
‡‡Inflorescence umbellate.
Whole plant including the glumes minutely pubescent . . . . . 13. *M. psilostachys.*
Whole plant glabrous.
Leaves $\frac{1}{8}$–$\frac{1}{5}$ in. broad . . . . . 12. *M. Taylori.*
Leaves $\frac{1}{10}$ in. broad or less.
Glumes mucronate . . . . . 15. *M. vestitus.*
Glumes muticous, hardly acute.
Spikelets compressed, leaves much withering . . . . . 14. *M. leptophyllus.*
Spikelets exactly linear-cylindric . . 16. *M. concinnus.*

††Spikelets ripening only 1 nut. (Cfr. also *M. remotus.*)
Inflorescence in 1 head.
Spikes 3–1, congested. Nut broadly obovoid.
Spikelets and glumes scarcely acute . . 17. *M. bulbocaulis.*
Spikelets and glumes acute, rather larger . 18. *M. plateilema.*
Spike 1 (apparently). Nut linear-oblong.
Bracts suberect, much dilated at the base . 19. *M. circumclusus.*
Bracts divaricate or deflexed, scarcely dilated at the base.
Basal leaf-sheaths torn into much soft fibre 20. *M. mollipes.*
Basal leaf-sheaths hardly at all fimbriate . 21. *M. globifer.*
Inflorescence a simple umbel. Leaves with scarious margins in their lower half . . . 22. *M. albomarginatus.*

** Eu-Mariscus.—Base of the stem not much thickened, but covered by sheaths foliaceous in texture, neither scarious nor marcescent.

† *Umbellati.*—Spikelets green or reddish, ultimately pallid, maturing 1–2 (rarely 3) nuts. Nut-bearing glumes approximate, suberect, wrapped round the nut (except in *M. deciduus*). Lowest empty glume lanceolate or mucronate, hardly long-setaceous (except in *M. flavus*). Nut often $\frac{3}{4}$ (rarely only $\frac{1}{2}$) the length of the glume.
Stem, with upper parts of the bracts, densely and shortly white hairy . . . . . 37. *M. albopilosus.*
Stem, and whole plant, glabrous.
Glumes, even before the nut is ripe, spreading, hardly imbricate . . . . . 36. *M. deciduus.*
Glumes suberect, adpressed, margins often enclosing the rhachilla.
Spikes deep chestnut-red, in one head . . . 32. *M. Kerstenii.*
Spikes lurid or blackish-green, in one head . . 35. *M. Soyauxii.*
Spikes from green or white to straw-colour or yellowish or brown, mostly umbelled. (These ten species might be treated as nine varieties of *M. sieberianus.*)
Lowest empty glume reduced to a bristle from a lanceolate base . . . . . 34. *M. flavus.*
Lowest empty glume lanceolate, or mucronate, not long-setaceous.
Spikelets often with 1 (or 1–2) nuts (except in *M. sieberianus*, var.).
Spikelets very slender, often all deflexed in fruit . . . . . 24. *M. umbellatus.*
Spikelets thicker, rarely deflexed in fruit.
Spikelets acute.

Spikelets spreading in fruit . . 23. *M. sieberianus.*
Spikelets adpressed, erect in fruit . 25. *M. sublimis.*
Spikelets subobtuse . . . . . 31. *M. macer.*
Spikelets with 3–2 nuts (see also *M. sieberianus*, var.).
Spikelets white . . . . . 30. *M. tomaiophyllus.*
Spikelets greenish-white to yellowish or brownish.
Spikelets usually with 2 nuts.
Spikes long-cylindric, often $1\frac{1}{4}$ in. long . . . . . 26. *M. nossibeensis.*
Spikes usually nearly as broad as long 33. *M. macrocarpus.*
Spikelets usually with 3 nuts.
Glumes obtuse, submucronate.
Spikelets subtetragonous . . 27. *M. tanyphyllus.*
Spikelets terete . . . . 29. *M. Myrmecias.*
Glumes much acuminate . . . 28. *M. Phillipsiæ.*
Spikelets reddish; spikes long cylindric in a simple umbel.
Spikelets $\frac{1}{8}$ in. long, perfecting 1 nut . . 38. *M. Rohlfsii.*
Spikelets $\frac{1}{4}$ in. long, perfecting 2–3 nuts . . 39. *M. procerus.*

†† *Subremoti.*—Spikelets green, ultimately pallid; maturing 3–2 nuts. Nut-bearing glumes remote, the top of one a little overlapping the base of the next . . 40. *M. thomensis.*

††† *Turgiduli.*—Spikelets straw-coloured to brown, thicker than in † and ††, nearly terete, 1–6-flowered. Robust plants with large compound umbels.
Glumes approximate, erect-adpressed even in fruit.
Spikelets densely packed . . . . . 41. *M. rufus.*
Spikelets many, but distinct . . . . . 43. *M. albescens.*
Glumes less close together, looser in fruit.
Leaves flat . . . . . 42. *M. umbilensis.*
Leaves much enrolled (at least as seen dry) . . 44. *M. durus.*

†††† *Flabelliformes.* Spikelets linear, not flattened, dull green, 4–10-flowered; glumes remote.
Bracts $\frac{1}{2}$ in. broad, 3-nerved; umbel large compound . 48. *M. trinervis.*
Bracts less than $\frac{1}{3}$ in. broad.
No horizontal rhizome.
Spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long, with 3–8 nuts . . 45. *M. flabelliformis.*
Spikelets $\frac{3}{4}$ in. long, with 5–8 nuts . . . 50. *M. luridus.*
Rhizome horizontal.
Leaves $\frac{1}{8}$–$\frac{1}{6}$ in. broad.
Spikelets $\frac{1}{3}$ in. long, with 4 nuts . . . 46. *M. eurystachys.*
Spikelets $\frac{1}{2}$ in. long, with 7 nuts . . . 47. *M. aximensis.*
Leaves $\frac{1}{5}$–$\frac{1}{4}$ in. broad . . . . . 49. *M. foliosus.*

††††† *Pseudo-Cypereæ.* Spikelets 4–10-flowered, oblong or lanceolate, more or less compressed (not linear terete). Glumes much imbricate, not (or hardly) remote.
Rhachis of spikes hairy . . . . . 55. *M. pseudopilosus.*
Rhachis of spikes glabrous.
Fertile glumes with long recurved mucro . . . 51. *M. squarrosus.*
Fertile glumes with short (or no) mucro.

Spikelets white-straw-coloured.
Leaves $\frac{3}{4}$ the length of the stem . . . 52. *M. hemisphæricus.*
Leaves $\frac{1}{4}$ the length of the stem . . . 54. *M. Gregorii.*
Spikelets yellowish-green. Leaves $\frac{1}{3}$ in. broad . 53. *M. alpestris.*

1. **M. dregeanus,** *Kunth, Enum.* ii. 120. Glabrous. Stolons 0. Stems approximate, at the base oblong-thickened by the scarious coloured leaf-sheaths, 6–14 in. long, slender, at the top trigonous and smooth. Leaves often as long as the stem, $\frac{1}{10}$–$\frac{1}{6}$ in. broad, weak, grass-like. Inflorescence $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{3}$–$\frac{1}{2}$ in., appearing as 1 very dense head of numerous spikelets, or as 2–3 densely congested spikes, straw-coloured or reddish or yellowish; bracts 3–4, similar to the leaves, spreading, finally pendent, lowest 3–7 in. long. Spikelets $\frac{1}{5}$ by $\frac{1}{12}$ in., quadrangular-cylindric obtuse, not compressed, bearing 2–6 (usually 3–4) nuts, disarticulating below the lowest fertile flower in one piece; two empty glumes small, without caudate green tips. Glumes ovate, obtuse, not keeled, strongly 13–15-ribbed over their whole breadth, chaffy, persistent, their margins running down into the elliptic wings of the rhachilla. Stamens 3–2; anthers oblong, not crested. Nut $\frac{1}{2}$ the length of the glume, oblong-ellipsoid, trigonous, from dark-brown to ashy-black, very smooth, the punctulation or reticulation very obscure. Style shorter than the nut; branches 3, linear, longish.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 620, in Durand & Schinz, Conspect. Fl. Afr. v. 586, and in Dyer, Fl. Cap. vii. 187; Durand & Schinz, Études Fl. Congo, i. 295; Rendle in Cat. Afr. Pl. Welw. ii. 120. *M. Kraussii,* Hochst. in Flora, 1845, 756. *M. kyllingiæformis,* Boeck. in Flora, 1859, 443, 496. *M. viridis,* Schweinf. Beitr. Fl. Aethiop. 217, according to the syn. cited. *Cyperus dubius,* Rottler in Neue Schr. Ges. Nat. Freunde Berlin, iv. (1803) 193; Boeck. in Linnæa, xxxvi. 336, in small part; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 133 partly; Henriques in Bolet. Soc. Brot. v. 209; Engl. Hochgebirgsfl. Trop. Afr. 143?; K. Schum. in Engl. Pfl. Ost-Afr. C. 121; not of Rottb. *C. kyllingiæoides,* Vahl, Enum. ii. 312; Kunth, Enum. ii. 94; Boeck. in Peters, Reise Mossamb. Bot. 543. *C. cruentus,* Boeck. in Linnæa, xxxvi. 338, not of Rottb. *C. scirpoides,* Spreng. Syst. i. 218 partly. *Schœnus coloratus,* var. β, Linn. Sp. Pl. ed. 2, 64. *Sch. niveus,* Murr. Syst. Veg. ed. xiii. 81.

Upper Guinea. Gold Coast: Accra, *Vogel! Don!* Old Calabar; *Robb!*

Lower Guinea. Island of St. Thomas: near Santa Anna and Angolares, *Moller & Quintas in Fl. Afr. Exsicc. Conimbric.,* 122! Lower Congo: Matadi, 300 ft., *Hens,* 32! 218! Angola: Loanda; in sandy soil near Penedo, rare, *Welwitsch,* 6807! Malange, *Pogge,* 462!

Mozamb. Dist. Zanzibar, *Schmidt,* 68! German East Africa: Usambara; Tanga, *Volkens,* 15! Usaramo; Dar es Salaam, *Kuntze,* 208! Rovuma River, *Meller!* Portuguese East Africa: Angorna Island, *Peters,* 37! 139! Beira, *Kuntze,* 201! Luabo River, *Kirk,* 31! Lower Zambesi, at Shupanga, *Kirk!* Inhambane, *Scott!* British Central Africa: Boruma, on the Zambesi, *Menyharth,* 662! Nyasaland; Shire Highlands, *Buchanan,* 61! Zomba, 2800–3500 ft., *Whyte!*

Also in South Africa, the Mascarene Islands, India and Borneo.

No authentic specimen of *M. kyllingiæformis*, Boeck., has been seen. But it would appear that the earlier-made species of this author, which are passed by in his later systematic work, were meant to be abandoned.

Var. *incrassatus*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 587. More robust. Leaves flat, $\frac{1}{3}$ in. broad, tough, almost leathery; sheaths large, not torn. Inflorescence $\frac{4}{5}$ in. in diam., of 4–7 spikes fused into a head.

Mozamb. Dist. Portuguese East Africa: Isle of Angorna, *Peters*, 38!

2. **M. coloratus,** *Nees in Linnæa*, ix. 286. Spikelets ovate or lanceolate, acute. Glumes subacute. Nut ashy-black, puncticulate or manifestly reticulated; otherwise as *M. dregeanus*.—Kunth, Enum. ii. 126; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 585; Rendle in Cat. Afr. Pl. Welw. ii. 120. *Cyperus coloratus*, Vahl, Enum. ii. 312; Schumach. Beskr. Guin. Pl. 34; Benth. in Hook. Niger Fl. 550; K. Schum. in Engl. Pfl. Ost-Afr. C. 121. *C. dubius*, Boeck. in Linnæa, xxxvi. 336 in great part; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 133 in great part; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 49. *Schœnus coloratus*, Linn. Sp. Pl. ed. 2, 64 partly. *Isolepis Bœckeleri*, Oliver in Trans. Linn. Soc. xxix. 167.

Upper Guinea. Gold Coast: Aquapim Mountains, *Vogel!* Niger Territory: Jeba, *Barter!*

Nile Land. Somaliland, *Miss Edith Cole!* British East Africa: Uganda; *Stuhlmann*, 1950! Kamasia, *Gregory*, 63! Rabai Hills, near Mombasa, *Taylor!*

Lower Guinea. Angola: Ambriz, *Monteiro!* Pungo Andongo; on rocks near Quilanga, *Welwitsch*, 6802! on rocks of the Præsidium, *Welwitsch*, 7162! Huilla; wooded pastures at Monino, *Welwitsch*, 6804! and without precise locality, *Curror!* *Welwitsch*, 7148!

Mozamb. Dist. Zanzibar, *Kirk!* German East Africa: Kilimanjaro; Maraugu, 7400 ft., *Volkens*, 1496! and without precise locality, *Speke & Grant!* Lake Tanganyika, *Cameron!*

Var. *macrocephala*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 586. Very large. Spikes 5–6, large, in one head —*Cyperus dubius, forma macrocephala*, Boeck. in Flora, 1870, 556.

Nile Land. British East Africa: Niamniam; at Makporru Hill, *Schweinfurth*, 3790! Uganda, *Stuhlmann*, 1384! Rabai Hills, near Mombasa, *Taylor!*

3. **M. diurensis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 586. Glabrous. Stolons numerous, slender, 1–2 in. long, clothed by red-brown striate scales, terminating in a shoot. Stems approximate, 4–12 in. long, slender, at the top trigonous and smooth, at the base ellipsoid-oblong, thickened by the leaf-sheaths torn into fibres. Leaves often as long as the stem, $\frac{1}{8}$ in. broad, weak. Head 1, ovoid, $\frac{1}{3}$ in. in diam., dense, dirty straw-coloured; bracts 4, up to 3–6 in. long, similar to the leaves, at the base dilated and suberect, then spreading. Spikelets $\frac{1}{5}$ in. long, very little compressed, 2–6-flowered, caducous in one piece by an articulation above the two lowest empty glumes. Glumes distant, in fruit not overlapping, ovate, obtuse, very strongly 11–13-ribbed, with red round small glands. Nut $\frac{1}{2}$–$\frac{2}{3}$ the length of the glume, trigonous, oblong-ellipsoid, black. Style nearly as

long as the nut; branches 3, linear.—*Cyperus diurensis*, Boeck. in Flora, 1879, 556; K. Schum. in Engl. Pfl. Ost-Afr. C. 121 (*djurensis*).

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 198! Mombasa, *Taylor!*

Mozamb. Dist. Zanzibar, *Taylor!*

Var. *gondana*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 586. Stems 12–16 in. long, less thickened at the base. Bracts less dilated at the base.—*Cyperus gondanus*, Boeck. Cyp. Novæ, i. 3.

Mozamb. Dist. German East Africa: Karagwe; Bukoba, *Stuhlmann*, 967! Unyamwezi; Gonda (Igonda), *Boehm*, 67A!

These examples are young, and may prove separable from *M. diurensis* when the fruit is known.

4. **M. firmipes,** *C. B. Clarke.* Basal sheaths firm, red-brown, with 20–40 strong ribs. Spikelets 2–3-flowered. Glumes when young thin, with few obscure ribs and no glands; otherwise as *M. diurensis.*

Mozamb. Dist. British Central Africa: Nyasaland; Zomba and Plains, 2500–3500 ft., *Whyte!*

The base of the stems not seen.

5. **M. remotus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 591. Glabrous. Stems 8–16 in. long, slender, at the top trigonous and smooth, at the base oblong-thickened by somewhat-torn leaf-sheaths. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{16}$ in. broad. Head 1, $\frac{1}{3}$ in. in diam., globose, of 30–40 spikelets, golden-yellow; bracts 3–2, somewhat dilated at the base, similar to the leaves, lower 1–2 in. long. Spikelet 2-flowered, producing 2 (or 1) nuts. Glumes very remote on the rhachilla, oblong-elliptic, very obtuse, thin, 9–13-striate. Stamens 3; anthers narrow, oblong, muticous, much exserted. Nut $\frac{2}{3}$ the length of the glume, oblong-ellipsoid, trigonous, at the top acuminate. Style long; branches 3, long, much exserted.

South Central. Congo Free State: River Lavoi (Luvoi), *Descamps!*

The fruit is not ripe and I did not ascertain that the rhachilla disarticulates above the two lowest glumes. The acuminate nut is not like *Mariscus*: the genus of this plant is thus not certain.

6. **M. maritimus,** *C. B. Clarke in Journ. Bot.* 1896, 226. Glabrous. Stem 16 in. long, slender, at the top trigonous and smooth, at the base scarcely thickened but with long loose bright-brown striate leaf-sheaths, torn into fibres. Leaves 12 by $\frac{1}{10}$ in., weak. Inflorescence of 5–6 spikes almost completely fused into 1 ovoid head, $\frac{2}{3}$ in. in diam., chestnut-red; bracts 4, similar to the leaves, lowest $3\frac{1}{2}$ in. long. Spikelets $\frac{1}{5}$ by $\frac{1}{12}$ in., 4-flowered, producing 3 nuts, caducous in one piece above the two lowest empty glumes. Glumes ovate, many-ribbed, neither acute nor keeled. Nut $\frac{2}{5}$ the length of the glume, oblong, trigonous, red-brown. Style linear, shorter than the nut; branches 3, linear.

Nile Land. British East Africa: on the sands of the seashore at Mambrui (Mombrui), *Gregory!*

7. **M. macropus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 590. Glabrous. Stems 10–20 in. long, slender, at the top trigonous and smooth, at the base ovoid-oblong, very much thickened by the sheaths of which the remains persist as coarse fibres; stems approximated in dense tufts. Leaves $\frac{1}{2}$–$\frac{2}{3}$ the length of the stem, very narrow, long setaceous at the tips. Head 1, ovoid, $\frac{1}{2}$ in. in diam., dirty white; bracts 3, similar to the leaves, lowest 1–2 in. long, somewhat dilated at the base. Spikelets $\frac{1}{5}$ in. long, narrow-lanceolate, very little compressed, dirty straw-coloured, 8–10-flowered, producing 6–8 nuts; caducous in one piece above the two lowest empty glumes. Glumes ovate, obtuse, obscurely 7–11-ribbed. Nut $\frac{1}{2}$–$\frac{2}{3}$ the length of the glume, ellipsoid, trigonous, pyramidal at each end, dark-brown. Style nearly as long as the nut; branches 3, linear.—*Cyperus macropus,* Boeck. in Flora, 1879, 550.

Nile Land. British East Africa: Jur; Kurshook Ali's Seriba, *Schweinfurth,* 1503! Jur Ghattas, *Schweinfurth,* 1917!

8. **M. somaliensis,** *C. B. Clarke in Kew Bulletin,* 1895, 229. Glabrous. Stems 4–8 in. long, slender, at the top trigonous and smooth, at the base oblong-ellipsoid, thickened by scarious (hardly fimbriate) leaf-sheaths. Leaves $\frac{1}{2}$–$\frac{2}{3}$ the length of the stem, setaceous, very weak. Head 1, $\frac{1}{2}$–1 in. in diam., of 5–11 digitate (or almost spicate) chestnut-red spikelets; bracts 3, setaceous, weak, lowest 1–2 in long. Spikelets $\frac{1}{2}$ by $\frac{1}{16}$–$\frac{1}{20}$ in., 12–16-flowered, hardly at all compressed, caducous in one piece above the two lowest empty glumes. Glumes closely packed, elliptic-acuminate acute, very strongly 13-ribbed, not keeled, persistent. Nut hardly $\frac{1}{3}$ the length of the glume, trigonous, obovoid, dark brown. Style very slender, nearly black, much longer than the nut; branches 3, linear, rather short.

Nile Land. Somaliland, *Mrs. Lort-Phillips!*

9. **M. Schimperi,** *Hochst. in Flora,* 1841, i. *Intell.* 20. Glabrous. Stolons 0. Stems approximate, 3–14 in. long, slender, at the top trigonous and smooth, at the base oblong-thickened by brown scarious entire or ultimately fimbriate leaf-sheaths. Leaves often as long as the stem, $\frac{1}{10}$–$\frac{1}{8}$ in. broad, weak. Head of usually 3–4 distinct spikes, the central subcylindric, the lateral often shorter; bracts 3–5, similar to the leaves, lowest up to 6 in. long. Spikelets numerous, green more or less variegated with red, $\frac{1}{4}$ in. long, oblong, compressed, producing 2–4 nuts, deciduous in one piece above the two lowest barren glumes. Glumes ovate, subacute, 12–20-ribbed. Nut trigonous, oblong or oblong-ellipsoid, $\frac{2}{3}$–$\frac{1}{2}$ the length of the glumes, dark brown, dotted. Style rather shorter than the nut; branches 3, longish.—Steud. in Flora, 1842, 596, and Syn. Pl. Glum. ii. 62; A. Rich. Tent. Fl. Abyss. ii. 491; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 592. *M. plateilema,* Steud. in Flora, 1842, 596. *Cyperus variegatus,* Boeck. in Linnæa, xxxvi. 337, var. & excl. syn. *C. dubius,* Boeck. in Linnæa, xxxvi. 336 partly; not of Vahl.

C. viridis, Schweinf. Beitr. Fl. Aethiop. 217 (cfr. *Mariscus viridis*, Hochst. ex Boeck. in Linnæa, xxxvi. 336).

Nile Land. Eritrea: Habab, 8000 ft., *Hildebrandt*, 362! Abyssinia: Tigre; on the top of Mount Sholoda, *Schimper*, 173! Samen; Mountains of Shoata, *Schimper*, 578! 1363! Agow; mountains near Mawerr, *Schimper*, 184; 2292! and without precise locality, *Schimper*, 179! 363! Somaliland, *Mrs. Lort-Phillips! Miss Edith Cole!*

10. **M. inflatus,** *C. B. Clarke.* Glabrous. Roots fibrous. Stems tufted, 2–4 in. long, rather stout, at the top trigonous and smooth, at the base enlarged by much-inflated leaf-sheaths, scarious with numerous chocolate veins and conspicuous withered scarious margins. Leaves green, longer than the stem, $\frac{1}{10}$ in. broad. Spikes 4–5, cylindric, $\frac{1}{2}$ by $\frac{1}{4}$ in., most dense with innumerable spikelets, blackish-green, sessile in one head; bracts 4, similar to the leaves, lowest up to 4 in. long. Spikelets when young, oblong-linear, $\frac{1}{8}$ in. long, often 2-flowered. Nut-bearing glumes ovate, obtuse, many-ribbed, not keeled. Style 3-branched.

Mozamb. Dist. British Central Africa; Nyasaland; *Day!*

11. **M. pilosulus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 591. Shortly hairy all over. Stems approximate, 12–16 in. long, slender, at the base oblong-thickened by coloured leaf-sheaths, rather densely hairy their entire length. Leaves overtopping the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Spikes 5–7, sessile, $\frac{2}{3}$ by $\frac{1}{4}$ in., dense with cinnamon-straw-coloured spikelets; bracts 3–5, lowest up to 5 in. long, similar to the leaves, hardly dilated at the base. Spikelets $\frac{1}{8}$ by $\frac{1}{24}$ in., slender, producing 3–2 nuts; lower empty glume often with a setaceous arista. Glumes ovate, obtuse, with numerous rather obscure ribs. Nut small, narrowly ellipsoid, trigonous. Style small; branches 3, linear, short. —*Cyperus pilosulus*, K. Schum. in Engl. Pfl. Ost-Afr. C. 122.

Mozamb. Dist. Zanzibar, *Taylor!*

12. **M. Taylori,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 594. Robust, glabrous. Stems approximate, 12–20 in. long, at the top trigonous and smooth, at the base oblong, thickened by red-white basal not fimbriated sheaths. Leaves numerous, as long as the stem, $\frac{1}{8}$–$\frac{1}{5}$ in. broad, flaccid. Rays of umbel up to 2 in. long, carrying 3–1 sessile spikes each; bracts 5–8, similar to the leaves, lowest up to 8 in. long. Spikes up to $\frac{2}{3}$ by $\frac{1}{3}$ in., cylindric, dense, reddish. Spikelets $\frac{1}{6}$ by $\frac{1}{24}$ in., rigid, spreading, usually ripening 3–2 nuts. Glumes ovate, hardly acute. Nut $\frac{1}{2}$–$\frac{2}{3}$ the length of the glume, broadly ellipsoid, trigonous; style-branches 3.—*C. clarkeanus*, K. Schum. in Engl. Pfl. Ost-Afr. C. 123.

Mozamb. Dist. German East Africa: between the coast and Uyui, *Taylor!*

13. **M. psilostachys,** *C. B. Clarke in Journ. Bot.* 1896, 225. Very minutely pubescent all over. Stem 16 in. long, at the base oblong thickened by scarious leaf-sheaths. Leaves $\frac{1}{2}$ the length of the stem, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, weak. Umbel-rays 4, 0–1 in. long, each bearing 1–3

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spikes; bracts 3, similar to the leaves, lowest up to 3 in. long. Spikes of 10–12 loosely arranged spikelets. Spikelets $\frac{1}{3}$ by $\frac{1}{24}$ in., ripening 5 nuts, red-brown; rhachilla winged, disarticulating above the two lowest empty glumes; even the wings hairy. Glumes remote, elliptic-oblong, obtuse, many-striate, minutely pubescent, finally adpressed erect. Nut $\frac{2}{3}$ the length of the glume, linear-oblong, red-brown.

Nile Land. British East Africa: Leikipia; at the springs of Njoro Larabwal, *Gregory*, 65!

Mozamb. Dist. German East Africa: between the coast and Uyui, *Taylor!*

14. **M. leptophyllus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 589. Glabrous. Stolons 0. Stems closely approximate, 8–16 in. long, slender, at the top trigonous and smooth, at the base oblong-thickened by scarious withering leaf-sheaths. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{12}$ in. broad, weak. Umbel-rays 2–3, up to $\frac{1}{4}$–$1\frac{1}{2}$ in. long, each with 3–1 spikes; bracts 4, similar to the leaves, lowest up to 4–6 in. long. Spikes ovoid or ellipsoid in outline, reddish varying from nearly white to a rich brown, of 6–16 spikelets. Spikelets $\frac{1}{3}$ by $\frac{1}{12}$ in., moderately compressed, ripening 6–8 nuts; rhachilla winged, disarticulating above the two lowest empty glumes and leaving a little cushion. Glumes ovate-oblong, obtuse, with 7 ribs; rather distantly placed on the rhachilla. Nut $\frac{1}{2}$–$\frac{2}{3}$ the length of the glume, ellipsoid, trigonous, brown. Style shorter than the nut; branches 3, linear, exserted.—*Cyperus leptophyllus*, Hochst. in Flora, 1844, 101; Boeck. in Linnæa, xxxvi. 299; Engl. Hochgebirsfl. Trop. Afr. 143; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 48, 103. *C. amauropus*, Steud. Syn. Pl. Glum. ii. 33; C. B. Clarke in Journ. Linn. Soc. xxi. 182; K. Schum. in Engl. Pfl. Ost-Afr. C. 120. *C. bulbosus*, var., Steud. in Flora, 1842, 594; A. Rich. Tent. Fl. Abyss. ii. 483; not of Vahl.

Nile Land. Nubia: Hor Tamanib, *Lord!* Eritrea: Keren, *Beccari*, 160! *Steudner*, 906! Valley of Haddas, 3200 ft., *Schweinfurth*, 112! Abyssinia: Samen; mountains at Shoata, *Schimper*, 1391! and without precise locality, *Schimper*, 183! British East Africa: Athi, *Gregory*, 30! Kikumbuliyu; Ngomeni, *Scott-Elliot*, 6255!

Mozamb. Dist. Zanzibar, *Taylor!* German East Africa: Usmawo; Kageyi, *Fischer*, 632! Karagwe; Bukoba, *Stuhlmann*, 1046!

Also in Egypt and Arabia.

15. **M. vestitus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 595. Leaves greener with less withered sheaths. Rays of umbel more numerous, 2–7. Spikelets narrower, subterete. Glumes minutely mucronate; otherwise as *M. leptophyllus*.—C. B. Clarke in Dyer, Fl. Cap. vii. 188. *Cyperus vestitus*, Hochst. ex Krauss in Flora, 1845, 755; K. Schum. in Engl. Pfl. Ost-Afr. C. 118. *C. usitatus*, Boeck. in Linnæa, xxxv. 511; C. B. Clarke in Journ. Linn. Soc. xxi. 176; not of Burchell.

Nile Land. British East Africa: Mau district, 7000 ft., *Scott-Elliot*, 6857!

Mozamb. Dist. German East Africa: Karagwe; at Kavingo, on the River Kagera, *Stuhlmann*, 1945! British Central Africa: Nyasaland; Mandala, *Scott-*

***Elliot*, 8461**! Mount Sochi, *Scott-Elliot*, 8574! Zomba, *Whyte and McClounie!* Namasi, *Cameron*, 93! 95!

Also in Extratropical South Africa.

The plants collected by Cameron (93) have very narrow leaves, the spikelets and glumes very obtuse, and may indicate a separable species.

16. **M. concinnus,** *C. B. Clarke in Journ. Bot.* 1896, 224. Glabrous. Stems 8–18 in. long, slender, at the top trigonous and smooth, at the base oblong-thickened by membranous leaf-sheaths. Leaves $\frac{1}{2}$ the length of the stem, $\frac{1}{12}$ in. broad, flaccid. Umbel-rays 2–5, $\frac{1}{4}$–2 in. long; bracts 3, similar to the leaves, lowest 3 in. long. Spikes of 2–8 spikelets, chocolate-red. Spikelets $\frac{3}{5}$ by $\frac{1}{8}$ in., turgid, slightly compressed, perfecting 6–10 nuts; rhachilla winged, disarticulating above the two lowest empty glumes. Glumes obtuse, with 9 slender ribs, erect in fruit, not keeled. Nut $\frac{1}{2}$ the length of the glume. broadly oblong, trigonous, black-red, dotted. Style rather shorter than the nut; branches 3, linear, exserted.

Nile Land. British East Africa: River Nagut, at Lake Elemeteita, 6500 ft., *Gregory*, 46! Giryama and Shimba (Tsimba) Mountains, *Taylor!*

17. **M. bulbocaulis,** *Hochst. in Flora*, 1844, 102. Glabrous. Stems 4–6 in. long, slender, at the top trigonous and smooth, at the base ovoid-thickened and enclosed by brown scarious leaf-sheaths. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{12}$ in. broad. Head of 3–2 ovoid spikes nearly fused into 1 dense head $\frac{1}{4}$–$\frac{1}{2}$ in. in diam., pale straw-coloured, more or less purple-spotted; bracts 3–4, similar to the leaves, dilated at the base, spreading, the lowest up to 2–3 in. long. Spikelets $\frac{1}{8}$ in. long, ovoid-oblong in fruit, ripening 1 nut only. Glumes ovate, acuminate, hardly acute, thin, with 5–7 obscure ribs. Nut $\frac{1}{2}$ the length of the glume, broadly ellipsoid, somewhat obovoid, trigonous, black. Style shorter than the nut; branches 3, linear, long.—*M. bulbosus*, Steud. Syn. Pl. Glum. ii. 62. *Kyllinga bulbosa*, Steud. in Flora, 1842, 597, not of Beauv. *Cyperus bulbocaulis*, Boeck. in Linnæa, xxxvi. 372; Engl. Hochgebirgsfl. Trop. Afr. 144, not *C. bulbocaulis*, Boeck. in Linnæa, xxxviii. 408.

Nile Land. Abyssinia: Samen; on hills near Enderder, *Schimper*, 579! and without precise locality, *Schimper*, 229!

Var. *atrosanguineus*, C. B. Clarke in Durand & Schinz, Conspect Fl. Afr. v. 585. Spikelets chestnut-red or chestnut-black, elongated.—*M. atrosanguineus*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 490. *M. Hochstetteri*, Walp. Ann. iii. 678. *M. plateilema*, var. *atrosanguinea*, Steud. Syn. Pl. Glum. ii. 62. *Cyperus variegatus*, var. *atrosanguineus*, Boeck. in Linnæa, xxxvi. 337; Engl. Hochgebirgsfl. Trop. Afr. 143 partly.

Nile Land. Abyssinia: Samen; Enjedcap, *Schimper*, 575! Begemeder; near Selamuko, *Schimper*, 1308! near Gafat, *Schimper!*

Mozamb. Dist. British Central Africa: Nyasaland; on rocks at Ndurandi, *Scott-Elliot*, 8477!

18. **M. plateilema,** *Steud. in Flora*, 1842, 596, *and Syn. Pl. Glum.* ii. 62, *character emended.* Bracts more dilated at the base. Spikelets

rather larger, very acute. Glumes at the top lanceolate, acuminate, acute; otherwise as *M. bulbocaulis*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 591. *M. bulbocaulis*, forma, A. Rich. Tent. Fl. Abyss. ii. 490. *M. Schimperi*, var. *compactior*, Hochst. in Flora, 1844, 102. *Cyperus variegatus*, Boeck. in Linnæa, xxxvi. 337, excl. var. β partly; Engl. Hochgebirgsfl. Trop. Afr. 143 partly.

Nile Land. Abyssinia: Samen; mountain sides near Shoata, *Schimper*, 588! Begemeder; Debra Tabor, 9000 ft., *Schimper!*

The larger acute spikelets do not match *M. bulbocaulis*, but the two species are very close.

19. **M. circumclusus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 585. Spike 1, surrounded by the dilated bracts, which in fruit are suberect. Spikelets $\frac{1}{6}$ in. long, narrow. Nut $\frac{1}{12}$ in. long, linear-oblong; otherwise as *M. bulbocaulis*.—*Cyperus circumclusus*, Schweinf in Bull. Herb. Boiss. ii. Append. ii. 103.

Nile Land. Abyssinia: Begemeder; Senka Berr, 6800 ft., *Schimper*, 1300!

20. **M. mollipes,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 590. Basal sheaths torn into many soft fibres, enveloping the thickened base of the stems. Bracts spreading, divaricated, at the base scarcely dilated. Nut linear-oblong; otherwise as *M. bulbocaulis*.—*Rhynchospora bulbocaulis*, Boeck. in Flora, 1879, 567. *Cyperus amomodorus* and *C. mollipes*, K. Schum. in Engl. Pfl. Ost-Afr. C. 122.

Nile Land. British East Africa: Jur; Mayob, *Schweinfurth*, 1547!

Mozamb. Dist. German East Africa: Karagwe; at Kavingo, on the River Kagera, *Stuhlmann*, 1950!

The spikelets and nut are as those of *M. circumclusus;* the bracts entirely want the dilated striated base seen in those of that species. As to the soft fibres into which the leaf-sheaths break up, such may have been present in the examples of *M. circumclusus*, but were not secured by the collector.

21. **M. globifer,** *C. B. Clarke in Journ. Bot.* 1896, 225. Glabrous. Stem 13 in. long, somewhat robust, at the top trigonous and smooth, at the base greatly ovoid-thickened by many brown leaf-sheaths with scarious margins. Leaves 6 by $\frac{1}{12}$ in., weak. Head 1, globose, dense, $\frac{2}{3}$ in. in diam., greenish-yellow; bracts 4, pendent, similar to the leaves, lowest 4 in. long. Spikelets when young $\frac{1}{5}$ in. long, linear-oblong, very slender, 2-flowered; upper flower male. Glumes oblong, rounded on the back, very thin, without ribs. Stamens 3; anthers linear-oblong, not crested. Style slender, moderately long; branches 3, very long, slender, exserted.

Nile Land. British East Africa: Athi, *Gregory*, 30!

Mozamb. Dist. German East Africa: between the coast and Uyui, *Taylor!*

22. **M. albomarginatus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 584. Glabrous. Stolons 0. Stems 6–16 in. long, slender, at the top trigonous and smooth, at the base oblong-thickened

by brown-striated fimbriated leaf-sheaths. Leaves $\frac{2}{3}$ the length of the stem, $\frac{1}{8}$ in. wide, in the lower part white-margined. Umbel-rays few, 0–2 in. long, usually quite short, bearing 1 spike each; bracts 5–6, similar to the leaves, lowest 4–6 in. long. Spikes $\frac{3}{5}$ by $\frac{1}{3}$ in., cylindric, dense with spikelets spreading at right angles, pallid or pale red. Spikelets $\frac{1}{6}$ by $\frac{1}{24}$ in., bearing 1 nut only, caducous from above the 2 lowest empty glumes. Glumes elliptic-oblong, obtuse, 10–16-striate. Nut $\frac{2}{3}$ the length of the glume, linear-oblong, trigonous, black. Style hardly $\frac{1}{2}$ the length of the nut; branches 3, linear, of moderate length. —C. B. Clarke in Dyer, Fl. Cap. vii. 187. *Cyperus albomarginatus*, K. Schum. in Engl. Pfl. Ost-Afr. C. 122.

Mozamb. Dist. British Central Africa: Nyasaland, *Buchanan*, 1432!
Also in Extratropical South Africa.

23. **M. sieberianus,** *Nees in Linnæa*, ix. 286. Glabrous. Stems 1–2½ ft. long, slender to medium-sized, at the top trigonous and striate, at the base more or less ovoid-thickened, approximate, but hardly forming any rhizome; lower sheaths often a dull red but much less scarious withering than in the subgenus *Bulbocaulis*. Leaves often $\frac{2}{3}$ the length of the stem, $\frac{1}{8}$–$\frac{1}{5}$ in. broad, much greener than in subgenus *Bulbocaulis*. Umbel simple, 1–5 in. in diam.; rays 5–12, up to 1–4 in. long; bracts 5–10, similar to the leaves, lowest up to 4–8 in. long, scarcely dilated at the base. Spikes solitary (see also var. γ), often 1 by $\frac{1}{4}$–$\frac{1}{3}$ in., exactly cylindric; bracts to the spikes 0 or minute and setaceous. Spikelets very numerous, not compressed, in fruit spreading rectangularly on all sides, or some towards the base of the spike deflexed, linear-lanceolate or lanceolate, bearing 1 or sometimes 2 nuts, dusky straw-colour or yellowish, never when ripe green or reddish. Two lowest glumes empty, persistent, lower triangular very shortly aristate or barely mucronate, upper obtuse about as long as the lower; spikelet disarticulating in one piece above these two glumes from a small cushion. Lowest flower-glume twice as long as the upper empty glume, ovate-oblong, obtuse, 7–11-ribbed, not keeled, margins enclosed round the rhachilla in fruit holding the nut; rhachilla above the nut-bearing glume (or above the upper nut-bearing glume if 2 nuts be present) $\frac{3}{4}$ the length of the nut-bearing glume, 1-nerved with 2 hyaline wings (closely simulating an upper male or sterile glume), surmounted by a small scarious rudiment (the true uppermost glume). Stamens 3–2; anthers linear-oblong, muticous. Style $\frac{1}{2}$ the length of the nut; branches 3, linear, twice the length of the undivided part of the style. Nut $\frac{2}{3}$–$\frac{3}{4}$ the length of the glume, linear-oblong or scarcely oblong, trigonous, chestnut-coloured, obpyramidal at the base, subobtuse at the top, dotted.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 622, in Durand & Schinz, Conspect. Fl. Afr. v. 593, and in Dyer, Fl. Cap. vii. 189; Durand & Schinz, Études Fl. Congo, i. 297; Durand & De Wild. in Comptes-rendus Soc. Bot. Belg. xxxvi. 89; Urban, Symb. Antill. ii. 40. *M. umbellatus,* Vahl, Enum. ii. 376 partly; Kunth, Enum. ii. 118 mainly. *Scirpus cyperoides,* Linn. Mant. 181. *Cyperus umbellatus*, Miq. in Ann. Mus. Lugd.-Bat. ii. 142. *C. umbellatus*, var. ε *cylindrostachys*, and var. α partly, C. B. Clarke

in Journ. Linn. Soc. xxi. 201. *C. ovularis*, Boeck. in Linnæa, xxxvi. 376, var. α partly, not of Torrey. *C. cylindrostachys*, Boeck. in Linnæa, xxxvi. 383 mainly; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 49 ?, 104 ? *C. steudelianus*, Boeck. in Engl. Jahrb. v. 91. *C. sieberianus*, K. Schum. in Engl. Pfl. Ost-Afr. C. 122. *C. leptophyllus*, Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 48 (at least as to Schweinf. n. 2136 cited).

Upper Guinea. French Guinea: Farana and Dantilia, *Scott-Elliot*, 5361A! Togo, *Kling*, 73! Cameroons: Yaunde, *Zenker*, 1503!

Nile Land. Eritrea: Ginda, 3200 ft., *Schweinfurth & Riva*, 2136! British East Africa: Ruwenzori, 5000 ft., *Scott-Elliot*, 7617! Undusuma, *Stuhlmann*, 2901!

Lower Guinea. Lower Congo; Stanley Pool, *Hens*, 377! above Stanley Pool, *Johnston!* Angola: Malange, *Pogge*, 459! 460! 461! *Buchner*, 12! San Salvador, *Buettner*, 13!

Mozamb. Dist. German East Africa: Karagwe; Kafuro, 4500 ft., *Stuhlmann*, 1881B! British Central Africa: Nyasaland; Kondowe to Karonga, *Whyte!* Shire Highlands, *Buchanan*, 22! Blantyre, *Scott!* Mount Malosa, *Whyte!* Mount Zomba, 4000–6000 ft., *Whyte!* Namasi, *Cameron*, 16! and without precise locality, *Buchanan*, 1427! Ngamiland; Kwebe Hills, 3300 ft., *Mrs. Lugard*, 142!

Also in South Africa, the Mascarene Islands, India, Malaya, Tropical Australia, and Polynesia.

This abundant species may be esteemed the type of the genus *Mariscus*, and is described here at length; the eleven following species (up to 34. *M. flavus*), being, in the opinion of competent botanists, only forms of *M. sieberianus* are described shortly as to the chief points wherein they differ from *M. sieberianus*. The synonymy is guess-work, except where the actual plants have been seen. I cannot agree with Boeckeler that any of the African material is conspecific with the North American *M. ovularis*, Vahl.

Var. *evolutior*, C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 622. Spikelets linear, maturing 2–4 nuts.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 593, and in Dyer, Fl. Cap. vii. 189. *C. sieberianus*, var. *polyphylla*, C. B. Clarke ex K. Schum. in Engl. Pfl. Ost-Afr. C. 122 partly.

Upper Guinea. Upper Senegal, *Lécard*, 140!

Nile Land. Uganda, *Stuhlmann*, 1349!

Mozamb. Dist. German East Africa: Kilimanjaro, at Marangu, 5000 ft., *Volkens*, 661! 1468!

Scattered over the area of typical *C. sieberianus*, and also not rare in Tropical America.

This is usually a stouter plant than typical *C. sieberianus*, with broader leaves. The spikelets being much longer, the spikes often exceed $\frac{1}{3}$ in. in breadth; but it is united with the type by a fine series of gradations.

Var. *subcomposita*, C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 622. Umbel sub-compound, i.e. at the apex of each ray are 3 subdigitate spikes (the central often much longer than the two lateral), supported at the base by somewhat conspicuous bracts.—*M. biglumis*, Gærtn. Fruct. i. 12, t. 2, fig. 8. *Cyperus biglumis*, C. B. Clarke in Journ. Linn. Soc. xxi. 199 partly.

South Central. Congo Free State: Lunda; Kibango, *Descamps*, 95!

Also in India, Japan, Malaya, and Oceania.

This variety only differs very slightly from *M. nossibeensis*.

24. **M. umbellatus**, *Vahl, Enum.* ii. 376 *partly.* Spikelets smaller, denser and more rigid than in *M. sieberianus;* spikes ½ by ⅙ in. (or often short and nearly globose); in ripe fruit all the spikelets strongly deflexed; rays of umbel often (some of them) many times longer than the spikes; nut oblong or almost ellipsoid; otherwise as *M. sieberianus.*—Benth. in Hook. Niger Fl. 552; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 595; Durand & Schinz, Études Fl. Congo, i. 298; Urban, Symb. Antill. ii. 41; Rendle in Cat. Afr. Pl. Welw. ii. 121. *M. alternifolius*, Vahl, Enum. ii. 376; Schumach. Beskr. Guin. Pl. 40; Kunth, Enum. ii. 126. *M. cylindristachyus*, Steud. Syn. Pl. Glum. ii. 65. *Kyllinga umbellata*, Rottb. Descr. et Ic. 15, t. 4, fig. 2, excl. some syns.; Linn. f. Suppl. 105. *Cyperus ovularis*, Boeck in Linnæa, xxxvi. 376, var. *a* partly, not of Torrey. *C. umbellatus*, C. B. Clarke in Journ. Linn. Soc. xx. 296 (excl. the varieties), xxi. 200 var. *a* partly; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 144; Boeck. in Engl. Jahrb. v. 91; Henriques in Bolet. Soc. Brot. v. 209; Boeck. in Engl. Gazelle Reise, Bot. 15.

Upper Guinea. Senegal: Mbidjem, *Thierry,* 12! Upper Senegal, *Lécard,* 77! 91! 102! 215 partly! Gambia, *Mungo Park!* Sierra Leone, *Smeathmann,* 85! *Vogel! Welwitsch,* 7062! Cape Verde Isles, *Bolle!* Liberia: Monrovia, *Naumann* (ex *Boeckeler*). Ashanti: Akraful, *Cummins,* 29! Dahomey, *Newton,* 2! Niger Territory: Nupe, *Barter! Baikie!* River Niger (Quorra), *Vogel! Marshall!* Guinea, *Jardin* (ex *Steudel*). Cross River, *Johnston!* Camercons: Bipinde, *Zenker,* 897! d without precise locality, *Preuss,* 110! 753! Fernando Po, *Barter,* 1584! an

Nile Land. Upper Sennar: Fazokl, *Figari!*

Lower Guinea. Island of St. Thomas, *Moller,* 124! Princes Island, *Welwitsch,* 7063! 7064! Annobon Island, *Burton!* Lower Congo, *Hens,* 100! 108! 268! 317! 390! 398! *Demeuse,* 341! Stanley Pool, *Luja,* 16! Angola: Golungo Alto; Quibanga Forest, *Welwitsch,* 7006! Pungo Andonga; on the Præsidium, *Welwitsch,* 7009 partly! Loanda, *Welwitsch,* 7102! and without precise locality, *Welwitsch,* 7008! 7008B! 7159! 7165!

South Central. Congo Free State: Mukenge, *Pogge,* 1575! 1579! and without precise locality, *Dewèvre,* 273!

Mozamb. Dist. German East Africa: Karagwe; Bukoba, *Stuhlmann,* 1447! Lake Tanganyika, *Boehm,* 81! British Central Africa: Nyasaland; Zomba Plains, 2500–3500 ft., *Whyte!*

Also in the Mascarene Islands and in Martinique.

25. **M. sublimis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 594. Umbel simple; rays 7–10, up to 2½ in. long. Spikes up to ¾ by ¼ in., very dense, pale grey; spikelets in ripe fruit (even those at the base of the spikelet) adpressed obliquely erect. Nut only 1 to a spikelet, ellipsoid, somewhat obovoid; otherwise as *M. sieberianus.*—*Killingia umbellata*, P. Beauv. Fl. Owar. i. 91 t. 55. *Cyperus steudelianus*, Boeck. in Flora, 1879, 556, not Boeck. in Linnæa, xxxvi. 382. *C. ovularis*, Boeck. in Flora, 1879, 557, not Boeck. in Linnæa, xxxvi. 376.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth,* 1508! 1842!

26. **M. nossibeensis,** *Steud. Syn. Pl. Glum.* ii. 63. Robust. Umbel simple or subcompound. Rays often 12, up to $4\frac{1}{2}$ in. long, each terminated by a cylindric spike, or sometimes by 3, the two small lateral spikes being sessile or short-peduncled up to $1\frac{1}{4}$ by nearly $\frac{1}{3}$ in., very dense, in fruit green or whitish-green. Spikelets in fruit (at least the lower) deflexed, oblong-lanceolate, maturing 2 nuts. Nut $\frac{1}{2}$–$\frac{2}{3}$ the length of the glume, ellipsoid-obovoid; otherwise as *M. sieberianus*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 590, and in Dyer, Fl. Cap. vii. 189; Durand & Schinz, Études Fl. Congo, i. 297. *Cyperus nossibeensis*, K. Schum. in Engl. Pfl. Ost-Afr. C. 122.

Upper Guinea. Upper Senegal, *Lécard*, 126! French Guinea: Farana, Dantilia, *Scott-Elliot*, 5361B! Niger Territory: Nupe, *Barter*, 1583! Lower Guinea: Lower Congo, *Hens*, 396!

Mozamb. Dist. Portuguese East Africa: River Shire, at the foot of Morambala Mountain, *Kirk!* British Central Africa: Nyasaland; Zomba Plains, 2500–3500 ft., *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!*

Also in the Mascarene Islands.

27. **M. tanyphyllus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 594. Spikelets in fruit oblong, subtetragonous, $\frac{1}{3}$ by $\frac{1}{16}$ in., standing separately, spreading at right angles, dusky ferruginous, maturing 3 nuts. Nut ellipsoid-obovoid; otherwise as *M. sieberianus*.—Rendle in Cat. Afr. Pl. Welw. ii. 120. *Cyperus tanyphyllus*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 143.

Lower Guinea. Angola: Golungo Alto; woods of Quibanga, *Welwitsch*, 7006B! wooded places near Banza de Quilombo, *Welwitsch*, 7010! woods of Sobato Quilombo-Quiacatubia, *Welwitsch*, 7171!

The leaves are not longer than the leaves of *M. sieberianus* frequently are; but they are much more flaccid. The spikes are much less dense than commonly in *M. sieberianus*; they have about 25 spikelets. The species resembles a good deal the American *Cyperus tetragonus*, Elliot.

28. **M. Phillipsiæ,** *C. B. Clarke.* Stems 8 in. long or more, slender, trigonous and smooth at the top. Umbel simple; rays 6–8, up to $1\frac{1}{4}$ in. long; bracts 5–6, flaccid, green, lowest up to 6–9 by $\frac{1}{8}$ in. Spikes on each ray $\frac{2}{3}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., cylindric, very dense, green obscurely variegated with dull ferruginous red. Spikelets $\frac{1}{6}$ in. long, hardly at all compressed, perfecting 3 nuts. Lowest empty glume small, ovate, with a linear mucro, upper empty glume rather shorter, quadrate, truncate. Fertile glumes ovate, long acuminate with minute recurved mucro, 7–11-ribbed. Nut $\frac{1}{2}$ the length of the glume, obovoid, trigonous, dark brown.

Nile Land. Somaliland, *Mrs. Lort-Phillips!*

This is close to *M. tanyphyllus;* but has very dense spikes, and the fertile glumes much acuminated.

29. **M. Myrmecias,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 590. Spikes ovoid-subcylindric, $\frac{3}{4}$ by $\frac{1}{2}$ in., of about 40 spikelets, sometimes subcompound at the base, when ripe a dusky

green. Spikelets in fruit spreading, up to $\frac{1}{3}$ by $\frac{1}{16}$ in., terete, maturing 3 nuts. Nut $\frac{1}{2}$ the length of the glume, broadly oblong.—Rendle in Cat. Afr. Pl. Welw. ii. 120. *Cyperus Myrmecias*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 144.

Lower Guinea. Angola: Huilla; between Lopollo and Monino, *Welwitsch*, 7059! woods of Monino, *Welwitsch*, 7060!

30. **M. tomaiophyllus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 594. Stem 1–3 ft. long, stouter, at the top $\frac{1}{8}$–$\frac{1}{6}$ in. in diam., trigonous and smooth. Leaves $\frac{3}{4}$ the length of the stem, $\frac{1}{4}$–$\frac{1}{3}$ in. broad; margins cutting the hand. Umbel simple; rays 7, up to $\frac{1}{2}$ in. long; bracts 6, similar to the leaves, lowest up to 7 in. long. Spikes $1\frac{1}{4}$ by $\frac{1}{2}$ in., exceedingly dense with very numerous spikelets. Spikelets a greenish straw-colour, perfecting 3 nuts, almost comose from the long-exserted cinnamon-coloured styles. Nut $\frac{1}{2}$ the length of the glume, oblong.—*Cyperus tomaiophyllus*, K. Schum. in Engl. Pfl. Ost-Afr. C. 122.

Mozamb. Dist. German East Africa: Kilimanjaro, 5000–9000 ft., *Meyer* 272! *Volkens*, 854! 1010!

Also in Madagascar.

This resembles *M. hemisphæricus;* and, according to K. Schumann, differs chiefly by the cutting edges of the leaves. The spikelets have fewer nuts than those of *M. hemisphæricus*.

31. **M. macer,** *Kunth, Enum.* ii. 121. Spikes 4–7, sessile or shortly peduncled, cylindric-oblong. Spikelets 1-flowered, in fruit spreading at right angles; lower empty glume mucronate or scarcely aristate; rhachilla of spikelet winged, simulating a glume, terminated by the rudiment (hardly distinguishable) of the sterile uppermost glume. Nut oblong, nearly as long as the glume; otherwise as *M. sieberianus*.—C. B. Clarke in Dyer, Fl. Cap. vii. 190. *M. pseudoflavus*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 591. *Cyperus cylindrostachys*, Boeck. in Linnæa, xxxvi. 383 partly. *C. umbellatus*, Oliver in Trans. Linn. Soc. xxix. 166 partly. *C. sieberianus*, K. Schum. in Engl. Pfl. Ost-Afr. C. 122 partly. *C. macer*, K. Schum. in Engl. Pfl. Ost-Afr. C. 122. *C. pseudoflavus*, K. Schum. in Engl. Pfl. Ost-Afr. C. 123.

Upper Guinea. Dahomey, *Newton*, 11!

Nile Land. British East Africa: Unyoro, 2500 ft., *Speke & Grant!*

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 5000 ft., *Volkens*, 2289! *Johnston!*

Also in Natal.

32. **M. Kerstenii,** *C. B. Clarke.* Lower leaf-sheaths stout, coarsely striate. Spikes condensed into an ovoid compound head, dark-purple. Spikelets maturing 2–4 nuts. Glumes at the top lanceolate; otherwise as *M. sieberianus*.—*Cyperus Kerstenii*, Boeck. in Linnæa, xxxvi. 373, and in Decken, Reisen Ost-Afr. Bot. 72; C. B. Clarke in

Durand and Schinz, Conspect. Fl. Afr. v. 565; Engl. Hochgebirgsfl. Trop. Afr. 144; K. Schum. in Engl. Pfl. Ost-Afr. C. 122. *C. vaginatissimus*, K. Schum. in Engl. Pfl. Ost-Afr. v. 121.

Mozamb. Dist. German East Africa: Kilimanjaro, 8000–10,000 ft., *Kersten! Volkens*, 794! 860A! 1327! 1516! 1562!

33. **M. macrocarpus,** *Kunth, Enum.* ii. 120. Spikes ovoid or short-cylindric, usually $\frac{1}{2}$ in. wide, all subsessile or very shortly peduncled. Spikelets maturing 2–3 nuts; lowest empty glume mucronate or scarcely aristate. Nut $\frac{3}{4}$ the length of the glume, broadly oblong; otherwise as *M. sieberianus* (large forms).—C. B. Clarke in Dyer, Fl. Cap. vii. 190; Rendle in Cat. Afr. Pl. Welw. ii. 120. *M. polyphyllus*, Steud. in Flora, 1842, 596, and Syn. Pl. Glum. ii. 65; A. Rich. Tent. Fl. Abyss. ii. 489. *M. sieberianus*, var. *polyphyllus*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 593, and in Trans. Linn. Soc. ser. 2, Bot. iv. 53. *M. umbellatus*, Oliver in Trans. Linn. Soc. xxix. 166 partly. *Cyperus macrocarpus*, Boeck. in Linnæa, xxxvi. 380; K. Schum. in Engl. Pfl. Ost-Afr. C. 122. *C. steudelianus*, Boeck. in Linnæa, xxxvi. 382. *C. sieberianus*, var. *polyphylla*, C. B. Clarke ex K. Schum. in Engl. Pfl. Ost-Afr. C. 122 partly. *C. paniceus*, Boeck. in Flora, 1879, 557; Oliver in Trans. Linn. Soc. ser. 2, Bot. ii. 353 partly; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 49 (at least as to his n. 1989), 104?; K. Schum. in Engl. Pfl. Ost-Afr. C. 122. *C. flavus*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 144.

Nile Land. Abyssinia: Samen; Enderder, *Schimper*, 1124! Amhara, *Steudner*, 908! British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 1989! Uganda, *Speke & Grant! Stuhlmann*, 1279!

Lower Guinea. Angola: Pungo Andongo, *Welwitsch*, 7009 partly!

Mozamb. Dist. Zanzibar, *Taylor!* German East Africa: Kilimanjaro, 5000 ft., *Johnston!* Karagwe; Kafuro, *Stuhlmann*, 1785! 1884! Bukoba, *Stuhlmann*, 3893! on hill tops, *Speke & Grant*, 412! Mwanza, on Lake Victoria, *Stuhlmann*, 4548!

Also in Natal.

This might be united with *M. flavus*, Vahl; but the Indian *M. paniceus* differs much by its slender stolons and rhizome.

34. **M. flavus,** *Vahl*, var. **humilis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 588. Spikes $\frac{2}{3}$ by $\frac{1}{2}$ in. Spikelets $\frac{1}{4}$ by $\frac{1}{16}$ in., maturing 2–5 nuts; lowest empty glume reduced to a bristle $\frac{1}{6}$ in. long, slightly widened and lanceolate at the base.

Lower Guinea. Lower Congo: Lutete, 2000 ft., *Hens*, 189! Kisantu, *Gillet*, 297!

Both type and variety are common in Tropical America, and the typical form also occurs in the Sandwich Islands.

35. **M. Soyauxii,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 593. Glabrous. Stems tufted, 10–14 in. long, slender, at the

top trigonous and smooth; leaf-sheaths entire, not striate. Leaves ¾ the length of the stems, hardly ⅛ in. broad, green, flaccid. Spikelets 16, condensed into a compound head, ½ in. in diam., lurid or blackish green; bracts 6–8, similar to the leaves, lowest up to 8–10 in. long. Spikelets ⅕ in. long, compressed, of 4 glumes, maturing 1 nut. Lowest empty glume lanceolate, acute, not bristle-tipped; nut-bearing glume ovate, acuminate, with a small recurved mucro, slenderly 9-striate, red-spotted. Stamens 3; anthers linear-oblong, muticous. Ovary lanceolate; style short; branches 3, long.—*Cyperus Soyauxii*, Boeck. in Engl. Jahrb. v. 501.

Upper Guinea. Gold Coast: Kwahu, 2000 ft., *Johnson*, 663!

Lower Guinea. Gaboon: Munda; Maveli, *Soyaux*, 325B!

36. **M. deciduus,** *C. B. Clarke in Dyer, Fl. Cap.* vii. 191. Glabrous, slender. Stem 12–18 in. long, at the top trigonous and smooth; basal leaf-sheaths not scarious withering. Leaves ⅓ the length of the stem, hardly ⅛ in. broad. Umbel-rays 3–5, slender, up to 1½ in. long, each terminated by 3–1 small subspicate spikelets; bracts 3, similar to the leaves, lowest shorter than the umbel. Spikelets $\frac{5}{10}$ in. long, very green, 2–4-flowered, early caducous in one piece above the two lowest empty obtuse glumes. Glumes approximate, but spreading on the wingless rhachilla, broadly oblong, neither ribbed nor keeled. Stamens 3; anthers linear-oblong, muticous. Style as long as the young ovary; branches 3, long.—*Cyperus deciduus*, Boeck. in Flora, 1879, 547; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 555.

South Central. Lunda: Kimbundu, on the River Lovo, *Pogge*, 466!

Also in the Transvaal.

37. **M. albopilosus,** *C. B. Clarke.* Stems 14 in. long, slender, at the top trigonous, densely and minutely white-hairy. Leaves 4 by ⅕ in., with their sheaths nearly glabrous, scabrous hairy towards the tip. Head ¼–⅓ in. in diam., dense, of numerous small white spikelets; bracts 3, spreading, the lowest up to 1½ in. long, similar to the leaves, often white-hairy towards the tip. Spikelet of 3 glumes, with a rudimentary glume, deciduous, with the 1 nut above the two lowest empty (not setaceous) glumes. Nut-bearing glume ovate, scarious-white, slenderly few-nerved; rhachilla broadly winged, resembling closely the nut-bearing glume, crowned by a triangular rudiment of the uppermost glume. Nut as long as the glume broadly ellipsoid, trigonous, black, white-reticulate. Style 3-branched.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Malosa, 4000–6000 ft., *Whyte!* Mount Zomba, 4000–6000 ft., *Whyte!*

38. **M. Rohlfsii,** *C. B. Clarke.* Glabrous. Stems 2 ft. high, rather stout, at the top triquetrous and smooth. Leaves ¾ the length of the stem, ⅕ in. broad. Umbel simple; rays 8, up to 1¾ in. long; bracts 6–8, similar to the leaves, lowest up to 12 in. long. Spikes 1 by ¼ in., exactly cylindric, of very numerous spikelets spreading at right angles, rose-red. Spikelets ⅛ in. long, oblong or ellipsoid, falling off

above the two lowest empty glumes, maturing 1 nut; lowest empty glume much exceeding the second, lanceolate, bristle-tipped. Nut-bearing glume ovate, obtuse, 11–13-ribbed, not keeled. Nut $\frac{3}{4}$ the length of the glume, linear-oblong, trigonous; style-branches 3, much exserted.—*Cyperus Rohlfsii*, Boeck. in Flora, 1882, 13; Engl. Hochgebirgsfl. Trop. Afr. 144.

Nile Land. Eritrea: Mount Alam Kale, *Schweinfurth & Riva*, 1476! Abyssinia, 8300 ft., *Rohlfs & Stecker* (ex *Boekeler*). British East Africa: Taita; Mount Ndi, *Scott-Elliot*, 6191!

39. **M. procerus,** *A. Rich. Tent. Fl. Abyss.* ii. 489, *not of Schrader*. Glabrous. Rhizome horizontal, stout. Stems $1\frac{1}{2}$–$2\frac{1}{2}$ ft. long, at the top triquetrous and smooth or nearly so. Leaves $\frac{3}{4}$ the length of the stem, $\frac{1}{6}$–$\frac{1}{4}$ in. broad. Umbel simple; rays 8–10, up to 1–$1\frac{1}{2}$ in. long; bracts 4–6, similar to the leaves, lowest up to 7 in. long. Spikes $1\frac{1}{4}$ by $\frac{1}{2}$ in., exactly cylindric, with 20–40 distinct spikelets spreading at right angles, bright-red in flower, red-brown in fruit. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long, oblong or lanceolate, hardly compressed, often 4-flowered, maturing 3–2 nuts, disarticulating in one piece above the two lowest empty glumes. Nut-bearing glumes ovate, obtuse, strongly 9–13-ribbed, hardly keeled, hardly remote but (even before the nut is ripe) obliquely and rigidly spreading. Nut $\frac{2}{3}$ the length of the glume, broadly oblong, trigonous, black-brown. Style $\frac{1}{2}$ the length of the nut; branches 3, long, much exserted.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 591. *M. Richardi*, Steud. Syn. Pl. Glum. ii. 66. *M. cupreus*, Hochst. ex Boeck. in Linnæa, xxxvi. 367; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 586 (excl. the syn. of Steudel). *Cyperus quadriflorus*, Boeck. in Linnæa, xxxvi. 367; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 104. *C. impubes*, Steud. Syn. Pl. Glum. ii. 45.

Nile Land. Abyssinia: Tigre; near Assai, *Quartin-Dillon!* British East Africa: Lake Elmeteita, 6000–7000 ft., *Scott-Elliot*, 6411!

40. **M. thomensis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 594. Glabrous. Stems 1 ft. long, slender, at the top trigonous and smooth. Leaves $\frac{1}{2}$ the length of the stems, $\frac{1}{6}$ in. broad, green. Umbel simple; rays 6–8 up to 1 in. long; bracts 6, similar to the leaves, lowest up to 5 in. long. Spikes $\frac{1}{3}$ in. long, ovoid or globose, dense, from green-straw-colour to yellow-straw-colour. Spikelets $\frac{1}{8}$–$\frac{1}{5}$ in., maturing 3–2 nuts, falling off in one piece above the two lowest (not aristate) glumes. Glumes remote (each nearly clear above the one below it) ovate, subobtuse, 11-ribbed. Nut $\frac{2}{3}$ the length of the glume, ellipsoid. Style short; branches 3, long.—*Cyperus flavus*, Henriques in Bolet. Soc. Brot. v. 209; not of Boeck.

Lower Guinea. Island of St. Thomas, *Moller in Fl. Afr. Exsicc. Conimbric.*, 123!

This plant does not remind me of the American *Mariscus flavus*. I think it may prove only one more variety of *M. sieberianus*.

41. **M. rufus,** *H. B. & K. Nov. Gen. et Sp.* i. 216, *t.* 67. Glabrous, robust. Rhizome hardly any. Stem 1–4 ft. long, at the top trigonous and smooth. Leaves $\frac{3}{4}$ the length of the stem, $\frac{1}{4}$–$\frac{1}{2}$ in. broad, very tough, often marked by small transverse lines, serrate-scabrous on the margins, and often on the keel beneath. Umbel 3–8 in. in diam., compound, with stout rays; bracts 4–7, similar to the leaves, lowest 12–18 in. long. Spikes numerous, congested, long-(or short-) cylindric, very dense, $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., rufous (from pale cinnamon to a full red-brown). Spikelets spreading at right angles or deflexed, inflated, terete, normally $\frac{1}{5}$ by $\frac{1}{16}$ in. with 3 nuts; not rarely (in the same spike) few or many spikelets grow out to $\frac{2}{3}$ in. in length, barren compressed; rhachilla deciduous in one piece above the two lowest empty glumes. Nut-bearing glumes ovate, obtuse, even in fruit adpressedly imbricate, 11–15-ribbed, uniformly reddish-brown, or (rarely) the hardly-keeled midrib green. Nut $\frac{1}{2}$ the length of the glume, triquetrous, suddenly narrowed at the top into a short acumination, chestnut-black. Style less than $\frac{1}{2}$ the length of the nut; branches 3, linear.—Kunth, Enum. ii. 123; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 592; Durand & Schinz, Études Fl. Congo, i. 297; Urban, Symb. Antill. ii. 48; Rendle in Cat. Afr. Pl. Welw. ii. 119. *Cyperus ligularis,* Linn. Amœn. Acad. v. 391, and Sp. Pl. ed. 2, 70; Schumach. Beskr. Guin. Pl. 40; Kunth, Enum. ii. 79; Benth. in Hook. Niger Fl. 551; Boeck. in Engl. Gazelle Reise, Bot. 15, and in Linnæa, xxxvi. 332; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 142, and in Journ. Linn. Soc. xxvii. 67; Henriques in Bolet. Soc. Brot. v. 208. *C. bidentatus,* Vahl, Enum. ii. 330; Kunth, Enum. ii. 62. *C. rubescens,* Schrader ex Steud. Syn. Pl. Glum. ii. 27. *C. glaucoviridis,* Boeck. in Allgem. Bot. Zeitschr. 1896, 19.

Upper Guinea. Senegambia, *Heudelot,* 442! Cape Verd, *Smith!* Gambia: Bathurst, *Don!* Sierra Leone, *Afzelius, Vogel,* 42! Liberia: Monrovia, *Naumann,* (ex *Boeckeler*), Gold Coast, *Burton!* Dahomey, *Newton!* Lagos, *Millen,* 219! Fernando Po, *Barter!*

Lower Guinea. Princes Island, *Welwitsch,* 7037! 7037B! Island of St. Thomas, *Rattray! Moller & Quintas in Fl. Afr. Exsicc. Conimbric.,* 121! Lower Congo, *Smith!*

Also in Madeira, the Mascarene Islands and Tropical America.

Var. *spicatocapitatus,* C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 592. Spikelets longer, maturing 4–7 nuts, brighter, more variegated in colour.—*Cyperus spicatocapitatus,* Jardin, Herbor. 7; Steud. Syn. Pl. Glum. ii. 27. *C. thyrsiflorus,* Boeck. in Flora, 1879, 557, and in Engl. Gazelle Reise, Bot. 15; not of Jungh.

Upper Guinea. Liberia: Monrovia, *Naumann* (ex *Boeckeler*). West Tropical Africa, *Jardin!*

Lower Guinea. Loango: Ponta Negra, *Soyaux,* 109!

42. **M. umbilensis,** *C. B. Clarke ex W. Watson in Gard. Chron.* 1891, x. 190. Stem at the top triquetrous and often scabrous. Glumes sub-remote on the rhachilla; spikelets less turgid; otherwise as *M. rufus.*—

C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 595, and in Dyer, Fl. Cap. vii. 193. *Cyperus umbilensis*, Boeck. ms. in herb. Schinz. *C. natalensis*, Hort. ex Gard. Chron. 1891, x. 90.

Lower Guinea. Damaraland; Walfish Bay, *Schinz!*

Frequent in South Africa.

43. **M. albescens,** *Gaud. in Freycinet, Voy.* 415. Spikelets not congested in the cylindric spikes, often pale or nearly straw-coloured, sometimes reddish or brown; otherwise as *M. rufus*.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 623, and in Durand & Schinz, Conspect. Fl. Afr. v. 584. *Cyperus stuppeus*, Forst. Prodr. 89 (*C. stipens*, Forster, ms.). *C. pennatus*, Lam. Ill. i. 144; Kunth, Enum. ii. 80; K. Schum. in. Engl. Pfl. Ost-Afr. C. 123. *C. canescens*, Vahl, Enum. ii. 355 (excl. syn. of Rheede); Boeck. in Linnæa, xxxvi. 340. *C. macreilema*, Jardin in Mém. Soc. Sc. Nat. Cherbourg. iv. (1856) 36 and v. (1857) 298. *C. pallidus*, Willd. ex Link in Sprengel, Jahrb. i. iii. 86. *C. fucatus*, Boeck. in Flora, 1882, 13.

Nile Land. British East Africa: Taita; Ndara, *Hildebrandt!* 2437!

Also in the Mascarene Islands, South-east Asia, Malaya, Australia and Polynesia.

44. **M. durus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 587. Glabrous, stoloniferous. Stems $1\frac{1}{2}$–$2\frac{1}{2}$ ft. long, at the top obtusely trigonous and smooth; basal leaf-sheaths with many strong ribs and scarious margins. Leaves $\frac{3}{4}$ the length of the stem, $\frac{1}{3}$ in. broad, strongly transversely striate, in the dried state rolled up, hard. Umbel nearly simple, the subcorymbose spikes nearly congested into compound heads at the end of each ray, chestnut-red or ferruginous-brown; bracts 3–5 up to 6–10 in. long, similar to the leaves, very unequal. Spikelets oblong, maturing 4 nuts. Glumes elliptic, obtuse. Nut linear-oblong; style 3-fid.—C. B. Clarke in Dyer, Fl. Cap. vii. 196; Rendle in Cat. Afr. Pl. Welw. ii. 119. *Cyperus durus*, Kunth, Enum ii. 76; Boeck. in Linnæa, xxxvi. 326. *C. lætus*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 123, 138, not of Presl.

Lower Guinea. Angola: Huilla; in damp wooded places near Eme, *Welwitsch*, 6860!

Also in South Africa.

This species might be esteemed only a variety of *M. tabularis,* which is common in South Africa.

45. **M. flabelliformis,** *H. B. & K. Nov. Gen. et Sp.* i. 215. Glabrous. Rhizome hardly any. Stems tufted, 12–20 in. long, slender, at the top trigonous and smooth. Leaves often as long as the stem, $\frac{1}{8}$ in. broad, green. Umbel simple; rays 2–8, short, rarely up to 1 in. long; bracts 4–6, similar to the leaves, lowest up to 4–8 in. long. Spikes $\frac{2}{3}$ by $\frac{1}{2}$–$\frac{2}{3}$ in., of numerous approximate (but distinct) spikelets spreading at right angles; bracts to the spikes often 2 scarcely $\frac{1}{4}$ in. long, bristle-like. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long, maturing 3–8 nuts, linear, not compressed but almost subquadrangular, a dull green-brown, disarticulating in one piece above the two lowest empty glumes.

Lowest empty glume lanceolate, hardly mucronate; each joint of the rhachilla about half the length of the glume; rhachilla appearing slightly flexuose. Nut-bearing glumes remote, elliptic-oblong, erect-adpressed even in ripe fruit, obtuse, with 7–9 nerves, green (hardly keeled) on the back, a dusky red or yellow on the sides. Nut $\frac{3}{4}$ the length of the glume, linear-oblong, chestnut-black; style 3-fid.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 588: Durand & Schinz, Études Fl. Congo, i. 295; Urban, Symb. Fl. Antill. ii. 50. *Cyperus caracasanus*, Boeck. in Linnæa, xxxvi. 358. *C. umbellatus*, Henriques in Bolet. Soc. Brot. v. 209 partly.

Upper Guinea. River Niger, *Marshall!* Old Calabar, *Holland*, 48! Cross River, *Johnston!* Cameroons: Batanga, *Bates*, 97! and without precise locality, *Bucholz!*

Lower Guinea. Island of St. Thomas, *Moller & Quintas in Fl. Afr. Exsicc. Conimbric.*, 124! Gaboon: Corisco Bay, *Strickland!* Loango; *Soyaux*, 109! 112! Lower Congo: Kinchassa, *Luja*, 183!

South Central. Congo Free State: Lukolela, 1000 ft., *Hens*, C, 152!

Also in Malaya, Polynesia and Tropical America.

This plant collected in Upper Guinea, has been received from various herbaria—always without a name. The material above cited appears to me most identically one plant; nor can I distinguish that plant from the American typical *M. flabelliformis*.

46. **M. eurystachys,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 587. Glabrous. Rhizome obliquely descending, $\frac{1}{8}$ in. in diam., covered by scales. Stem $2\frac{1}{2}$ ft. long, at the top $\frac{1}{8}$ in. in diam., triquetrous and smooth. Leaves $\frac{3}{4}$ the length of the stem, $\frac{1}{5}$ in. broad. Umbel simple; rays 10, up to $1\frac{1}{2}$ in. long; bracts 8, similar to the leaves, lowest up to 16 in. long. Spikes $\frac{4}{5}$ in. long and broad, dense, of 40 spikelets spreading at right angles, dull green. Spikelets $\frac{1}{3}$ by $\frac{1}{24}$ in., linear, terete, maturing 4 nuts. Nut-bearing glumes elliptic, obtuse, 13-ribbed, adpressed-erect in fruit. Nut $\frac{1}{2}$ the length of the glume, trigonous, oblong, black; style 3-fid.—Rendle in Cat. Afr. Pl. Welw. ii. 120. *Cyperus eurystachys*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 143.

Lower Guinea. Angola: Huilla; in damp places in woods, *Welwitsch*, 7061!

This species is close to *M. flabelliformis*, H. B. & K., from which it differs in the rhizome, also in the spikelets and nuts being a little broader.

47. **M. aximensis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 584. Glabrous. Rhizome obliquely descending. Stem 1 ft. long, at the top trigonous and smooth. Leaves $\frac{3}{4}$ the length of the stem, $\frac{1}{4}$ in. broad, green. Umbel simple; rays 11, up to 1 in. long; bracts 8, similar to the leaves, lowest up to 7 in. long. Spikes $\frac{4}{5}$ by $\frac{1}{3}$ in., of 40 spikelets, dense, a dusky straw-colour. Spikelets in fruit obliquely erect, $\frac{1}{2}$ by $\frac{1}{16}$ in., almost terete, maturing 7 nuts. Glumes elliptic-oblong, obtuse, finally spreading obliquely a little. Nut $\frac{2}{3}$ the length of the glume, broad oblong; otherwise as *M. flabelliformis*.

Upper Guinea. Gold Coast: Axim, *de Gurig*, 37 !

This differs mainly from *M. flabelliformis* by having more nuts (7) to the spikelet, and therefore longer spikelets; the spikes are not broader owing to the spikelets being obliquely erect. The rhizome and broader nut are additional differences.

48. **M. trinervis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 595. Glabrous. Neither stem nor leaves seen. Umbel-rays 7, up to $2\frac{1}{2}$ in. long, each carrying 3–6 closely subcorymbose spikes; bracts 6, lowest, 11 by $\frac{1}{2}$ in., flat, rigid, scabrous on the margins, with numerous striations and 2 stronger lateral nerves. Spikes $\frac{4}{5}$ by $\frac{3}{5}$ in., of 20 spikelets spreading at right angles, pale brown. Spikelets linear, hardly at all compressed, maturing 8 nuts, falling off in one piece above the two lowest empty glumes. Nut-bearing glumes subremote, ovate, at the top obtusely triangular, obliquely suberect, almost nerveless on the sides. Nut $\frac{1}{2}$ the length of the glume, narrowly obovoid, brown, truncate at the top. Style hardly any; branches 3, linear, hardly exserted.

South Central. Lunda: Mukenge, *Pogge*, 1582 !

49. **M. foliosus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 588. Glabrous. Rhizome 1–$1\frac{1}{2}$ in. long, horizontal. Stems 1–2 ft. long, at the top trigonous and smooth. Leaves longer than the stem, $\frac{1}{5}$–$\frac{1}{4}$ in. broad, scabrous at the tips. Umbel compound; rays 10–12, up to 4 in. long; bracts 6–9, similar to the leaves, lowest 8 in. long. Spikes 3–1 together, as long as broad, rather loosely spicate, of 20 spikelets, spreading at right angles or deflexed, dull green. Spikelets $\frac{1}{2}$ by $\frac{1}{24}$ in., subterete, maturing 3–5 nuts, disarticulating in one piece above the two lowest empty glumes. Glumes very remote, ovate-lanceolate, somewhat keeled, erect-adpressed on the nut. Nut more than $\frac{1}{2}$ the length of the glumes, narrowly oblong, trigonous, black; style 3-branched.—*Cyperus foliosus*, K. Schum. in Engl. Pfl. Ost-Afr. C. 122.

Nile Land. British East Africa: Kivata, in Ruwenzori district, 9000 ft., *Scott-Elliot*, 7674! Rabai Hills, near Mombasa, *Taylor !*

Mozamb. Dist. British Central Africa: Nyasaland; Mount Zomba, 4000–6000 ft., *Whyte !* Nyika Plateau, 6000–7000 ft., *Whyte !*

This is near *M. flabelliformis*, but has broader leaves, and usually longer spikelets.

50. **M. luridus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 589. Leaves and bracts $\frac{1}{8}$–$\frac{1}{5}$ in. broad. Umbel-rays hardly up to 1 in. long. Spikelets lurid-green, $\frac{3}{4}$ by $\frac{1}{24}$ in., maturing 5–8 nuts; rhachilla wavy. Nut-bearing glumes very remote, oblong, obtuse; otherwise as *M. foliosus* or *M. flabelliformis*.—Durand & De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 89; Durand & Schinz, Études Fl. Congo, i. 296.

South Central. Congo Free State: by the River Congo at Lulonga, 900–1000 ft., *Hens*, C, 155 !

51. **M. squarrosus,** *C. B. Clarke in Hook. f. Fl. Brit. Ind.* vi. 623. A slender glabrous annual. Stems tufted, 1–5 in. long, at the top trigonous and smooth. Leaves as long as the stem, $\frac{1}{12}$–$\frac{1}{8}$ in. broad. Umbel subsimple; rays 1–5 in. long; bracts much longer than the umbel, similar to the leaves. Spikes of 6–20 spikelets, densely spicate. Spikelets compressed, 6–20 flowered, greyish-green to brown, divaricate, disarticulating in one piece above the two lowest empty glumes. Glumes boat-shaped, the 3–5-nerved keel excurrent into a recurved bristle. Stamen 1; anther linear-oblong, not crested. Nut $\frac{1}{2}$ the length of the glume (exclusive of the bristle), linear-oblong, trigonous, curved, chestnut-red. Style $\frac{1}{2}$ the length of the nut, red; branches 3, linear, short.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 594. *Cyperus squarrosus*, Linn. Amœn. Acad. iv. 303, and Sp. Pl. ed. ii. 66 partly; Rottb. Descr. et Ic. 25, t. 6, fig. 3; Kunth, Enum. ii. 22; Boeck. in Linnæa, xxxv. 501; C. B. Clarke in Journ. Linn. Soc. xx. 284 and xxi. 94 (excl. var. β); K. Schum. in Engl. Pfl. Ost-Afr C. 118. *C. maderaspatanus*, Willd. Sp. Pl. i. 278, excl. syn. Plukenet; cf. Benth. Fl. Austral. vii. 268 in note.

Nile Land. British East Africa: Mombasa, *Taylor!*

Mozamb. Dist. British Central Africa: Nyasaland; *Buchanan*, 624c!

Also in the Mascarene Islands, India and Cochinchina.

52. **M. hemisphæricus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 589. Glabrous. Rhizome short. Stems 1½–3 ft. long, robust or medium-sized, at the top trigonous and smooth or somewhat rough. Leaves ¾ the length of the stem, up to $\frac{1}{2}$ in. broad, often scabrous on the margins; the large examples have stout leaves often marked with transverse lines, smaller examples have much greener and narrower leaves. Umbel simple or compound; rays attaining 2 in. in length, or more frequently rays very short and the umbel condensed; bracts 5, similar to the leaves, the lowest attaining 8–12 in. in length. Spikes densely spicate, of numerous rectangularly spreading spikelets, very white or shining straw-coloured in the typical form, but some examples (even young) are dusky-brown. Spikelets up to 1 by $\frac{1}{10}$ in., with 18 nuts, more usually shorter with 6–10 nuts, in fruit appearing distinctly compressed, but in examples (not ripe) where the glumes are adpressed erect the spikelets are subterete or very little compressed; rhachilla disarticulating in one piece above the 2 lowest empty glumes. Lower empty glume sometimes lanceolate and muticous, sometimes terminating in a long twisting bristle. Glume ovate, obtuse, boat-shaped, 1-coloured, obscurely 9-nerved, in the typical form very minutely ciliate on the upper margins. Nut $\frac{1}{2}$ the length of the glume, narrowly oblong, hardly curved, black. Style $\frac{1}{3}$ the length of the nut; branches 3; linear.—*Mariscus* sp. n. 2, T. Thoms. in Speke, Nile, Append. 654. *Mariscus* cf. *dactyliformis*, C. B. Clarke in Trans. Linn. Soc. ser. 2, Bot. iv. 53. *Cyperus hemisphaericus*, Boeck. in Flora, 1859, 436 ter. (a typogr. error for 439 bis.), in Peters, Reise Mossamb. Bot. 541, and in Linnæa, xxxvi. 345; Oliver in Trans. Linn. Soc. xxix. 166; K.

Schum. in Engl. Pfl. Ost-Afr. C. 122, *C. Hildebrandtii*, Boeck. in Flora, 1880, 436.

Nile Land. British East Africa: Ukambi; Kitui, *Hildebrandt* 2654! River Sabaki, *Gregory!* Mombasa, *Wakefield!* Rabai Hills, near Mombasa, *Taylor!* Ribe, *Wakefield!*

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1074! *Bojer!* German East Africa: Usambara; Tanga, *Holst*, 2014! Usaramo; Dar es Salaam, *Kuntze*, 214! East of the coast-range, *Speke & Grant!* Rovuma River, *Meller!* Portuguese East Africa: Lower Zambesi; Tete, *Peters!* British Central Africa: Nyasaland; Kondowe to Karonga, 2000–6000 ft., *Whyte!* Blantyre, *Scott!* Shire Highlands, *Buchanan*, 26! Mandala, *Scott-Elliot*, 8505! Mount Malosa, 4000–6000 ft., *Whyte!* Zomba Plains, 2500–3000 ft., *Whyte!* Mount Mlanji, *Whyte!* Namasi, *Cameron*, 7! and without precise locality, *Buchanan*, 1429! 1430!

The typical examples of this, with very white spikelets, appear easily recognisable, but they can hardly be distinguished from *M. tomaiophyllus* but by the more numerous nuts to the spikelet; they have the top of the stem and margins of the leaves smooth or more or less rough. The examples of Meller from the Rovuma River may represent another species; the spikelets are here browner, becoming a dusky brown, and they appear narrower and nearly terete. I find that they have the upper margins of the glumes very minutely ciliate as in typical *M. hemisphæricus*. They have the glumes, in imperfectly ripe heads, adpressed-erect; whereas in the typical *M. hemisphæricus* the glumes are, in the perfectly ripe heads, obliquely spreading.

53. **M. alpestris,** *C. B. Clarke.* Glabrous. Rhizome short, horizontal. Stems 2–2½ ft. long, at the top triquetrous and scabrous or nearly smooth. Leaves ⅔ the length of the stem, ⅛ in. broad, tough; margins smooth or scabrous. Umbel compound, 3 in. in diam.; rays hardly ⅓ in. long; bracts 7–10, similar to the leaves, lowest a foot long. Spikes shortly cylindric, ⅘ in. broad, dense, yellowish-green. Spikelets ⅖ by $\frac{1}{16}$ in., moderately compressed, maturing 4–6 nuts, disarticulating in one piece above the two lowest glumes. Glumes oblong-elliptic, obtuse, scarcely spreading. Nut ⅗ the length of the glume, linear-oblong, trigonous, brown. Style 3-branched.—*Cyperus alpestris*, K. Schum. in Engl. Pfl. Ost-Afr. v. 122.

Mozamb. Dist. German East Africa: Kilimanjaro, 8250 ft., *Volkens*, 872!

54. **M. Gregorii,** *C. B. Clarke in Journ. Bot.* 1896, 225. Glabrous. Stem 1 ft. long, stout, nearly round, at the top obscurely trigonous, at the base nodose thickened. Leaves several, 4 by ¼ in., tough, scarcely scabrous on the margins. Umbel simple, condensed, 1½ in. in diam.; rays 7–8, 0–½ in. long; bracts 5, similar to the leaves, the lowest 4 in. long. Spikes ⅗ in. long and broad, of 16 spikelets, straw-coloured. Spikelets nearly ½ by ⅛ in., compressed, maturing 6 nuts. Glumes ovate-oblong, obtuse, 9-ribbed, ultimately adpressed-erect; upper margins quite glabrous. Nut ⅗ the length of the glume, broad-oblong, black. Style ½ the length of the nut; branches 3, long.

Nile Land. British East Africa: River Tana, *Gregory*, 93!

This species is close to *M. hemisphæricus*, differing by the shorter leaves.

55. **M. pseudopilosus,** *Durand & De Wild. in Comptes-rendus Soc. bot. Belg.* xxxvi. 89. Glabrous except the rhachis of the spikes. Stem at the top $\frac{1}{5}$ in. in diam., triquetrous, almost 3-winged. Umbel compound or simple; primary rays 5–7, up to 3 in. long; bracts 5–8, lowest up to 12 by $\frac{1}{2}$ in.; bracts at the top of the primary rays up to $1\frac{1}{2}$–2 in. long. Spikes subcorymbose-digitate, 1 in. long, of 10–30 spikelets; rhachis densely short-hairy. Spikelets $\frac{1}{4}$ by $\frac{1}{16}$ in., deflexed in fruit, 10–12-flowered, dirty straw-coloured, deciduous in one piece above the two lowest empty glumes. Fertile glumes remote, elliptic, obtuse, concave, Nut $\frac{3}{5}$ the length of the glume, ellipsoid, trigonous, black. Style $\frac{1}{2}$ the length of the nut; branches 3, linear.

Lower Guinea. Lower Congo: Bingila, *Dupuis!*

This species, not only in the hairy rhachis of the spikes but in inflorescence and general aspect remarkably simulates *Cyperus pilosus*, Vahl.

Imperfectly known species.

56. **M. microcephalus,** *Presl, Rel. Hœnk.* i. 182. Large, with long spongy leaves and bracts. Umbel compound; spikes in dense globose brown heads. Spikelets narrowly linear, terete, straight, perfecting 4–14 nuts. Glumes rather remote, obtuse. Style 3-fid. Nut narrowly obovoid.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 624, and in Durand & Schinz, Conspect. Fl. Afr. v. 590. *Cyperus dilutus*, Vahl, Enum. ii. 357; Boeck. in Linnæa, xxxvi. 354; K. Schum. in Engl. Pfl. Ost-Afr. C. 122.

Mozamb. Dist. German East Africa: Kilimanjaro, ex *Schumann.*

Also in India, Malaya, South China, and Mauritius.

Not seen by me from Africa; the two Mauritian examples may have been imported with rice. The Kilimanjaro examples of K. Schumann have not been seen, and I do not feel at all sure that they were *M. microcephalus.*

57. **M. foliosissimus,** *Steud. Syn. Pl. Glum.* ii. 65. Roots fibrous. Stems tufted, 1 ft. long, at the top triquetrous and smooth. Leaves longer than the stem, narrowly linear, many-nerved, a little scabrous on the margins. Umbel simple; rays 5–7, very shortly divided at their tips into few-flowered densely-aggregated heads; bracts numerous, very long, similar to the leaves. Spikelets ovate, compressed, 2–4-flowered. Glumes ovate, obscurely nerved, very shortly mucronate, green-brown.

Upper Guinea. Senegal? *Lenormand* (ex *Steudel*).

6. **TORULINIUM,** Desv. in Hamilt. Prod. Ind. Occid. 1825, 15.

Spikelets with 4 or more nuts, the rhachilla breaking up into as many joints as there are nuts; each joint (by the aid of the wings and the

persistent glume) holding tight the nut; otherwise as *Mariscus*.—*Cyperus*, Benth. et Hook. f. Gen. Pl. iii. 1043, partly.

Species 8, viz., 7 in Tropical America and the subjoined in the Tropics of both hemispheres.

The 8 species of *Torulinium* form a very closely-allied group, separated by an absolute character from all other *Cypereæ*; and may be arranged as a distinct genus, or as a subgenus of *Mariscus*.

1. **T. confertum,** *Hamilt. Prod. Ind. Occid.* 1825, 15. Glabrous, medium-sized to very large. Stolons 0. Stem 1–4 ft. high, at the top trigonous or triquetrous, smooth or somewhat rough. Leaves often $\frac{3}{4}$ the length of the stem, $\frac{1}{4}$ in. broad. Umbel compound, 4–6 in. in diam. (but sometimes very large, sometimes condensed into 1 head); bracts long, similar to the leaves. Axis of a spike often $\frac{2}{3}$ in. long, with 20 rectangularly spreading spikelets. Spikelets $\frac{1}{3}$ by $\frac{1}{16}$ in., yellowish to brown, terete, with 4–16 (usually 6–7) nuts; rhachilla wavy. Glumes elliptic, obtuse, 7-ribbed, not keeled, ultimately adpressed-erect or rigidly spreading. Nut $\frac{1}{2}$ the length of the glume, oblong or somewhat obovoid, trigonous, black. Style $\frac{1}{2}$ the length of the nut; branches 3, linear.—Urban, Symb. Antill. ii. 53. *T. ferox*, Kunth, Enum. ii. 90 in citation. *Cyperus odoratus*, Linn. Sp. Pl. ed. i. 46 as to the plate of Sloane cited only, not of ed. ii. 68, nor of Linn. herb. propr.; Boeck. in Linnæa, xxxvi. 67. *C. ferax*, L. C. Rich. in Act. Soc. Hist. Nat. Paris, i. (1792) 106; Kunth, Enum. ii. 89; Boeck. in Linnæa, xxxvi. 399; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 142; K. Schum. in Engl. Pfl. Ost-Afr. C. 123. *C. rhaphiostachys*, Kunth, Enum. ii. 68; Boeck. in Peters, Reise Mossamb. Bot. 541, and in Linnæa, xxxvi. 352. *C. pseudostrigosus*, Steud. Syn. Pl. Glum. ii. 46. *C. consocius*, Steud. ex Jardin in Mém. Soc. Sc. Nat. Cherb. iv. (1856) 11, and v. (1857) 299. *Mariscus ferax*, C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 624, and in Durand & Schinz, Conspect. Fl. Afr. v. 587; Rendle in Cat. Afr. Pl. Welw. ii. 120.

Upper Guinea. Lagos: Ebute Metta, *Millen*, 11!

Lower Guinea. Princes Island, *Welwitsch*, 7033! *Newton*, 7! Angola: Icolo e Bengo; margin of Lake Quilunda, *Welwitsch*, 7052! Huilla; near Monino, *Welwitsch*, 6880!

Mozamb. Dist. Common on the Zambesi, ex *Boeckeler*.

Throughout the Tropics, abundant in Oceania and America.

I unite the names above cited under one widespread and variable species. This being done, the present plant has 71 published names, besides a large number of "MS." names published in citations without descriptions.

7. COURTOISIA, Nees; Benth. et Hook. f. Gen. Pl. iii. 1046.

Spikelets compressed, 1–10-flowered, disarticulating in one piece above the two lowest empty glumes. Fertile glumes distichous, boat-shaped, narrowly winged on the keel. Style 3-fid, persistent. Nut narrowly oblong, trigonous.—Glabrous annuals. Stems naked, i.e. bearing all the

leaves close to the base, the inflorescence at the top. Leaves as long as the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad, green, weak. Umbel simple or compound; bracts similar to the leaves, overtopping the umbel. Spikelets 4–12 together, clustered in subglobose heads, yellow to brown.

Species 2, one of which is common in India. This genus only differs from *Mariscus* by the extension of the keel of the fertile glume into a narrow wing, glistening by reason of the loose tissue; and should perhaps be merged in *Mariscus*.

Spikelets maturing 1–2 nuts; fertile glume recurved-mucronate . . . . . 1. *C. cyperoides.*
Spikelets maturing 8–2 nuts; fertile glume shortly mucronate . . . . . 2. *C. assimilis.*

1. **C. cyperoides,** *Nees in Linnæa*, ix. 286. Stems 3–16 in. long, tufted, rather slender, at the top trigonous and smooth. Umbel-rays 3–10, up to 1–4 in. long. Spikes $\frac{1}{5}$–$\frac{1}{2}$ in. in diam. Spikelets maturing 1–2 nuts. Fertile glumes with a distinct slightly recurved mucro. Nut brown, smooth, at the top lanceolate-acuminate. Style hardly any; branches 3, linear, long.—Kunth, Enum. ii. 127; Benth. in Hook. Ic. Pl. t. 1341; Boeck. in Flora, 1861, 335, and in Linnæa, xxxv. 434; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 625, in Durand and Schinz, Conspect. Fl. Afr. v. 596 (var. *africana* incl.) and in Bull. Herb. Boiss. iv. Append. iii. 31; Ridley in Journ. Linn. Soc. xx. 334. *Cyperus kleinianus*, Hochst. ex Steud. Syn. Pl. Glum. ii. 71.

Nile Land. British East Africa: Malewa (Morendat) River, near Lake Naivasha, *Gregory*, 42!

Lower Guinea. German South-west Africa: Hereroland, *Schinz*, 370!

Mozamb. Dist. Zanzibar, *Taylor!* British Central Africa: Matabeleland; banks of the River Matengwe, *Holub!* Nyasaland; Kondowe to Karonga, 2000-6000 ft., *Whyte!*

Also in Madagascar and India.

The Matabeleland plant, maturing usually 2 nuts to a spikelet, has been named *C. assimilis*, and I hardly know how it differs from some *C. assimilis* plants maturing 2–4 nuts. I doubt whether *C. cyperoides* and *C. assimilis* can be kept specifically distinct.

2. **C. assimilis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 596. Spikelets maturing 8–2 nuts. Fertile glumes shortly mucronate; otherwise as *C. cyperoides.*—*Cyperus assimilis*, Steud. in Flora, 1842, 584, and Syn. Pl. Glum. ii. 13; A. Rich. Tent. Fl. Abyss. ii. 486; Boeck. in Linnæa, xxxv. 579; Engl. Hochgebirgsfl. Trop. Afr. 140.

Nile Land. Abyssinia; near Gapdia, *Schimper*, 1252! near Adowa, *Schimper*, 1074! near Amogai, *Schimper*, 843! Shireh Province, *Quartin-Dillon & Petit!*

The type form of this, with spikelets $\frac{1}{4}$ in. long and upwards, maturing 8 nuts, appears distinct enough from *C. cyperoides*, but connecting forms occur.

8. ELEOCHARIS, R. Br.; Benth. et Hook. f. Gen. Pl. iii. 1047.

Spikelets of many or few perfect flowers, imperfect at the top, one or two lowest glumes empty. Glumes obtuse, in 3 or numerous spirals,

at least towards the top of the spike; the lower glumes sometimes subdistichous. Hypogynous bristles 3–9 or 0, in many species only sometimes present, in some species never seen. Stamens 3–1, anterior; anthers linear-oblong, muticous. Style 2–3-fid, constant for each of our species except in the subgenus *Limnochloa*, glabrous; style-base enlarged, persistent, distinct from the nut by a constriction or a horizontal line. Nut trigonous or biconvex, according as the style-branches are 3 or 2.—Glabrous, leafless. Stem with 1, apparently terminal, spikelet (sometimes proliferous at the base with a second spikelet). Spikelet bractless, i.e. the lowest empty glume hardly different from the fertile glumes.

Species 113, distributed nearly throughout the world, prevalent in America.

*Limnochloa.—Flower-glumes hardly keeled, $\frac{1}{6}$–$\frac{1}{4}$ in. long. Robust, stoloniferous plants.

Stem transversely septate; nut not cancellate	1. *E. plantaginea.*
Stem not transversely septate; nut cancellate.	
Stem nearly terete at the top; hypogynous bristles depauperate	2. *E. mitrata.*
Stem acutely triquetrous; hypogynous bristles fully developed	3. *E. fistulosa.*

**Eleogenus.—Glumes 1–3-nerved on the keel. Style 2-fid.

Annuals; plants rather slender.	
Hypogynous bristles white, sometimes small or 0	4. *E. atropurpurea.*
Hypogynous bristles ferruginous or brown	5. *E. capitata.*
Stouter plant, with stolons	6. *E. palustris.*

***Eu-Eleocharis.—Glumes 1–3-nerved on the keel. Styles 3-fid.

Nut cancellate or strongly reticulate	7. *E. chætaria.*
Nut smooth, not cancellate.	
Annuals; slender plants.	
Spikelets loosely few-flowered, compressed; lower glumes subdistichous	8. *E. Trilophus.*
Spikelets very densely flowered, subterete; glumes spirally many-ranked.	
Hypogynous bristles 0.	
Nut very much narrowed at the top; style-base small.	
Stems slender, subquadrangular	9. *E. Hildebrandtii.*
Stems stouter, subcompressed	10. *E. complanata.*
Nut slightly narrower at the top; style-base large	11. *E. anceps.*
Hypogynous bristles 7, longer than the nut	12. *E. Kirkii.*
Hypogynous bristles 3–5, shorter than the nut	13. *E. microcarpa*
Rhizome present; stouter plant often 12–18 in. long	14. *E. marginulata.*

1. **E. plantaginea,** *R. Br. Prodr.* 224 *in note.* Glabrous. Stolons long, $\frac{1}{8}$–$\frac{1}{6}$ in. in diam. Stems 16–30 in. long, $\frac{1}{8}$–$\frac{1}{3}$ in. in diam., terete, when dry transversely septate. Spikelet 1, 1 by $\frac{1}{6}$–$\frac{1}{4}$ in., straw-coloured. Glumes nearly $\frac{1}{4}$ in. long, suberect, obovate, obtuse. Hypogynous bristles 7, often as long as the nut, retrorsely scabrous,

yellow-brown. Style-branches 3 or 2. Nut $\frac{1}{3}$–$\frac{2}{3}$ the length of the glume, biconvex or unequally trigonous, smooth, brown, neither ribbed nor transversely barred.—Kunth, Enum. ii, 153; Benth. Fl. Austral. vii. 292 in obs.; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 625, and in Durand & Schinz, Conspect. Fl. Afr. v. 600; Rendle in Cat. Afr. Pl. Welw. ii.121. *Scirpus plantaginoides*, Rottb. Descr. et Ic. 45, t. 15, fig. 2. *Heleocharis plantaginea*, Boeck. in Linnæa, xxxvi. 474, excl. the description and the American plants; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 149 partly.

Lower Guinea. Angola: Huilla; ponds by the river Cacolovar, near Lake Ivantala, *Welwitsch*, 6968!

In the Mascarene Isles, South and East Asia (common), Queensland and Polynesia.

2. **E. mitrata,** var. **africana,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 599. Glabrous. Stolons long, hardly $\frac{1}{16}$ in. in diam. Stems 12–18 in. long, $\frac{1}{10}$ in. in diam., nearly terete, not transversely septate. Spikelet 1, 1 by $\frac{1}{8}$ in., greyish-green. Glumes $\frac{1}{6}$–$\frac{1}{5}$ in. long, ovate, obtuse. Hypogynous bristles 7, about half the length of the nut, white, nearly smooth. Style 2-fid. Nut $\frac{1}{2}$ the length of the glume, biconvex, almost urn-shaped, dirty straw-coloured; superficial cells transversely oblong, superposed in 24–30 vertical series (i.e. nut cancellate); style-base almost mitre-shaped.—Urban, Symb. Antill. ii. 62.

Upper Guinea. Niger Territory: Nupe, *Barter*, 1040!

Also in Tropical America?

The typical *E. mitrata* (i.e. *Scirpus mitratus*, Griseb.) has the spikelets more or less variegated with red; and the hypogynous bristles yet more depauperated. Barter n. 1040 may be esteemed a geographical variety or a closely allied species.

3. **E. fistulosa,** *Link in Sprengel, Jahrb.* iii. 78. Glabrous. Stolons long, $\frac{1}{8}$–$\frac{1}{6}$ in. in diam. Stems 1–3 ft. long, $\frac{1}{8}$–$\frac{1}{4}$ in. in diam., at the top triquetrous, not transversely septate. Spikelet 1, 1–1$\frac{1}{4}$ by $\frac{1}{6}$–$\frac{1}{5}$ in., from straw-colour to brown. Glumes $\frac{1}{5}$–$\frac{1}{4}$ in. long, obovate, obtuse. Hypogynous bristles 6, as long as the nut, retrorse-scabrid, rusty-red. Style-branches 3, or, according to authors, sometimes 2. Nut $\frac{1}{2}$ the length of the glume, obovoid, unequally trigonous, straw-coloured; superficial cells transversely oblong, superposed in 24–30 vertical series (i.e. nut cancellate); style-base ovoid-conic, chestnut-coloured.—Kunth, Enum. ii. 155; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 626, in Durand & Schinz, Conspect. Fl. Afr. v. 598, and in Dyer, Fl. Cap. vii. 198; Rendle in Cat. Afr. Pl. Welw. ii. 121. *E. acutangula* and *E. media*, Schultes in Roem. & Schultes, Syst. Veg. ii. Mant. 91. *Scirpus fistulosus*, Poir. in Lam. Encycl. vi. 749. *Heleocharis fistulosa*, Boeck. in Linnæa, xxxvi. 472, and in Flora, 1879, 563; K. Schum. in Engl. Pfl. Ost-Afr. v. 124. *H. plantaginea*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 149 partly.

Upper Guinea. Senegambia, *Heudelot*, 320! Senegal, *Perrottet*, 839! Cape Verd, *Perrottet!* Sierra Leone: Bagru River, *Mann*, 893! French Guinea:

pond near Erimakuna, *Scott-Elliot*, 4453! Whydah, *Isert!* Lagos: Lagos Island, *Barter*, 2234!

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2326!

Lower Guinea. Lower Congo: Kisantu, on the River Inkissi, *Gillet*, 1373! 1375! Angola: Ambaca, *Welwitsch*, 6842!

Mozamb. Dist. German East Africa: Gonda (Igonda), *Boehm*, 106!

Also in Madagascar, South Africa, India, China, Malaya and Australia.

The corresponding species in Tropical America, *E. mutata*, R. Br., is exceedingly near this, and is united with it, perhaps rightly, by Boeckeler.

4. **E. atropurpurea,** *Kunth*, *Enum.* ii. 151. A glabrous annual. Stems tufted, 2–6 in. long, slender. Spikelet 1, $\frac{1}{8}$–$\frac{1}{4}$ in. long, ovoid or cylindric, very dense, with many flowers, dull greenish-red. Glumes elliptic, obtuse, caducous. Hypogynous bristles 5–7, white, retrorse-scabrid, in the African plant usually $\frac{1}{2}$–$\frac{3}{4}$ the length of the nut, sometimes shorter, or wanting or represented by a minute white cup. Stamens 3–1. Style-branches 2. Nut $\frac{1}{2}$–$\frac{2}{3}$ the length of the glume, obovoid, biconvex, smooth, shining black. Style-base depressed conic, glistening white.—J. Gay in Flora, 1842, 641; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 627, and in Durand & Schinz, Conspect. Fl. Afr. v. 596; Durand & Schinz, Études Fl. Congo, i. 298; Urban, Symb. Antill. ii. 65. *E. capitata*, var., Benth. in Hook. Niger Fl. 553. *E. monandra*, Hochst. ex Steud. Syn. Pl. Glum. ii. 75. *Scirpus atropurpureus*, Retz. Obs. v. 14. *Isolepis setifolia*, A. Rich. Tent. Fl. Abyss. ii. 498. *I. dichroa*, Steud. Syn. Pl. Glum. ii. 91. *Isolepis* sp., Oliver in Trans. Linn. Soc. xxix. 168. *Heleocharis atropurpurea*, Koch, Syn. Fl. Germ. ed. ii. 853; Boeck. in Linnæa, xxxvi. 458, excl. var. γ.

Upper Guinea. Senegal, *Roger*, 113! *Perrottet*, 334! 829!

Nile Land. Kordofan: in muddy places on Arashkol Mountain, *Kotschy*, 129! Abyssinia, *Quartin-Dillon & Petit!*

Lower Guinea. Lower Congo, *Smith!*

Also in North Italy and Switzerland, Mauritius, India, China, Malaya, Queensland, and throughout Tropical America.

Occasionally there are "radical" spikelets, i.e. some of the tufted peduncles are shortened almost to suppression, as occurs in various species of *Pycreus*, *Fimbristylis*, and *Bulbostylis*.

5. **E. capitata,** *R. Br. Prodr.* 225. A glabrous annual. Stems tufted, 2–8 in. long, in Vogel's examples exceeding a foot. Spikelet 1, ovoid, lanceolate or cylindric, dense, dull greenish-red, usually $\frac{1}{10}$–$\frac{1}{4}$ in. long, in Vogel's examples $\frac{1}{2}$ by $\frac{1}{6}$ in. Glumes elliptic, obtuse, caducous from the lowest fertile glume upwards. Hypogynous bristles 7 or fewer, as long as the nut, ferruginous or red-brown, retrorse scabrid, or sometimes much depauperated, occasionally to a 6-notched small cup. Stamens 3–1. Style-branches 2. Nut $\frac{2}{5}$ the length of the glume, obovoid, biconvex, smooth, shining black; style-base depressed conic,

pallid.—Kunth, Enum. ii. 150, excl. several syns.; Benth. in Hook. Niger Fl. 553; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 627; and in Durand & Schinz, Conspect. Fl. Afr. v. 597, incl. var. β; Durand & Schinz, Études Fl. Congo, i. 299; Urban, Symb. Antill. ii. 66. *E. setacea*, R. Br. Prodr. 225, not the homonymous sp. 224; Kunth, Enum. ii. 156. *Scirpus capitatus*, Linn. herb. partly; Vahl, Enum. ii. 250. *Heleocharis capitata*, Boeck in Linnæa, xxxvi. 461; K. Schum. in Engl. Pfl. Ost-Afr. C. 124.

Upper Guinea. Senegal, *Roger! Heudelot*, 549! *Perrottet*, 198! 828! 830! Sierra Leone: Bagru River, *Mann*, 891! Liberia: Cape Palmas, *Vogel*, 7!

Nile Land. Somaliland, *Revoil*, 137!

Lower Guinea. Lower Congo, *Smith!*

Also in Arabia, India, China, Malaya, Australia, Polynesia, and throughout America.

The hypogynous bristles, when reduced to a small 6-toothed cup, were called by Nees a disc. Kunth supposed that by "disc" Nees understood the obpyramidal 3- (or several-) toothed gynophore of *Scleria* and of many species of *Fimbristylis*. But the two discs are not homologous: the stamens are entirely within the "disc" of *Eleocharis*, entirely without the disc of *Fimbristylis*.

6. **E. palustris,** *R. Br. Prodr.* 224, *in note*. Glabrous. Rhizome creeping. Stems 4–20 in. long. Spikelet $\frac{1}{3}$–$\frac{2}{3}$ by $\frac{1}{5}$ in., subcylindric, dense, chestnut to dusky straw-colour. Glumes elliptic, obtuse. Hypogynous bristles 6, retrorse-scabrous, slightly longer than the nut, ferruginous-brown, but variable in number, often 4, more or less depauperated, occasionally 0. Stamens normally 3. Style-branches 2. Nut $\frac{1}{2}$ the length of the glume, obovoid, biconvex, yellowish to brown; style-base ovoid or conic with a constriction (neck) above the nut, pallid or dusky or red-spotted.—Kunth, Enum. ii. 147; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 628, in Durand & Schinz, Conspect. Fl. Afr. v. 600, and in Dyer, Fl. Cap. vii. 198; Rendle in Cat. Afr. Pl. Welw. ii. 121. *Scirpus palustris*, Linn. Sp. Pl. ed. ii. 70 partly; Desf. Fl. Atlant. i. 47. *Heleocharis palustris*, Lindl. Syn. Brit. Fl. 280; Webb & Berth. Iles Canaries Phyt. iii. 365; Coss. & Durieu, Expl. Scient. Algér. Glum. 238; Boeck in Linnæa, xxxvi. 466 excl. all with 3 style-branches; J. Ball in Journ. Linn. Soc. xvi. 702; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 149; Engl. Hochgebirgsfl. Trop. Afr. 149 partly.

Lower Guinea. Angola: Huilla; damp sandy places by the river in the Lopollo District, *Welwitsch*, 6969!

Almost throughout the world, as abundant as widespread; I have seen no example from Australia or from Brazil.

7. **E. chætaria,** *Roem. & Schultes, Syst. Veg.* ii. 154, *Mant.* 90, 540. Glabrous. Roots fibrous, rarely with a white filiform rhizome 1 in. long. Stems 1–6 in. long, tufted. Spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. long, ovoid, pallid or red-tinged, maturing 1–5 nuts, sometimes proliferous at the base, i.e. stem with 2 spikelets. Lower nut-bearing glumes in 2–3 spirals, boat-shaped, hardly acute. Hypogynous bristles 6, as long as the nut,

retrorse-scabrous, pallid, or fewer or reduced or nearly wanting. Stamens 3–2. Style-branches 3. Nut obovoid, with 3 angles, truncate at the top, white, conspicuously and coarsely cancellate by subquadrangular reticulations on the faces; style-base nearly as broad as the nut, pyramidal, dusky black.—Kunth, Enum. ii. 140; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 629, and in Durand & Schinz, Conspect. Fl. Afr. v. 597; Urban, Symb. Antill. ii. 68; Rendle in Cat. Afr. Pl. Welw. ii. 121. *E. setacea*, R. Br. Prodr. 224 in note, not the homonymous sp. 225. *Cyperus setaceus*, Retz. Obs. v. 10. *Scirpus chætarius*, Spreng. Syst. i. 203. *Heleocharis chætaria*, Boeck. in Linnæa, xxxvi. 428, and in Flora, 1879, 562; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 148; Engl. Hochgebirgsfl. Trop. Afr. 149.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2583!

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 1137! 1138! 1370! Angola: Huilla; on the lofty pastures of Morro de Monino, *Welwitsch*, 6964!

Also in India, Malaya and Tropical America.

8. **E. Trilophus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 601. A glabrous annual. Stems 1–3 in. long, tufted, very slender. Spikelet 1, $\frac{1}{10}$ in. long, ovoid or subcylindric, a rich brown, loosely 4–7-flowered. Lower nut-bearing glumes in 2–3 spirals, ovate, obtuse. Hypogynous bristles 3–5, $\frac{1}{2}$ the length of the nut, pallid, retrorse-scabrid. Style-branches 3. Nut $\frac{1}{2}$ the length of the glume, oblong-obovoid, smooth, with 3 strong ribs at the angles, white, very truncate, the 3 angles subexcurrent in points on the shoulders; style-base depressed pyramidal.

Upper Guinea. Senegal, *Roger*, 113! *Perrottet!*

9. **E. Hildebrandtii,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 598. A glabrous annual. Stems 2–4 in. long, tufted, slender. Spikelet $\frac{1}{8}$ in. long, cylindric, green marked with dull red. Nut-bearing glumes in many spirals, ovate, obtuse. Hypogynous bristles 0. Style-branches 3. Nut $\frac{1}{2}$ the length of the glume, obovoid, much narrowed at the top, trigonous, smooth, white; style-base small, bulbous, not $\frac{1}{2}$ the width of the nut.—*Heleocharis Hildebrandtii*, Boeck. in Flora, 1878, 34; K. Schum. in Engl. Pfl. Ost-Afr. C. 124.

Mozamb. Dist. Zanzibar, *Kirk! Hildebrandt*, 1063!

10. **E. complanata,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 598. Stems 6–9 in. long, rather stouter than in *E. Hildebrandtii*, flattened rather than quadrangular; heads rather larger; otherwise as *E. Hildebrandtii*.—*Heleocharis complanata*, Boeck. in Flora, 1879, 562.

Upper Guinea. Niger Territory: Nupe, in rice fields, *Barter*, 1574!

Nile Land. Bongo: Gir, *Schweinfurth*, 2576!

The nut is identical with that of *E. Hildebrandtii*, and the plant may be only a large state of that species.

11. **E. anceps,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 596. A glabrous annual. Stems tufted, 4–6 in. long, obscurely flattened. Spikelet $\frac{1}{5}$ in. long, subcylindric or narrow-ellipsoid, many-flowered, yellow-green with dull red marks. Nut-bearing glumes in many spirals, obtuse. Hypogynous bristles 0. Style-branches 3. Nut hardly $\frac{1}{2}$ the length of the glume, obovoid, only slightly narrowed towards the truncate top, acutely 3-ribbed, smooth, white; style-base bulbous, rather large, $\frac{3}{4}$ the width of the nut.—Rendle in Cat. Afr. Pl. Welw. ii. 121. *Heleocharis anceps*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 148.

Lower Guinea. Angola: Pungo Andongo; damp sandy places on the banks of the River Cuanza near Conda, *Welwitsch*, 6817! and in damp woods between Mopopa and Sansamanda, *Welwitsch*, 7170!

12. **E. Kirkii,** *C. B. Clarke.* A glabrous annual. Stems tufted, 3–5 in. long. Spikelet $\frac{1}{6}$ in. long, ellipsoid, pale obscure reddish, many-flowered. Nut-bearing glumes in many spirals, obtuse. Hypogynous bristles 7, longer than the nut, retrorse-scabrid, rusty brown. Style-branches 3. Nut $\frac{1}{2}$ the length of the glume, trigonous, obovoid, slightly narrowed at the truncate top, pallid, smooth; style-base subglobose, straw-coloured, of loose tissue.

Mozamb. Dist. British Central Africa: on an island in the River Zambesi at Victoria Falls, *Kirk!*

13. **E. microcarpa,** *Torrey in Ann. Lyceum New York*, iii. (1836), 312. A glabrous annual. Stems tufted, 4–8 in. long, slender. Spikelet $\frac{1}{6}$–$\frac{1}{4}$ in. long, 10–20-flowered, pale brown-green. Nut-bearing glumes in many spirals, ovate, obtuse. Hypogynous bristles 3–5, $\frac{1}{3}$–$\frac{2}{3}$ the length of the nut, retrorsely hispid, white. Style-branches 3. Nut scarcely $\frac{1}{2}$ the length of the glume, trigonous, obovoid, narrowed at the top to half its width, smooth, straw-coloured or brown; style-base ovoid, $\frac{1}{2}$ the width of the nut, concolorous with it.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 599; Urban, Symb. Antill ii. 71. *Heleocharis microcarpa*, Boeck. in Linnæa, xxxvi. 439. *H. schweinfurthiana*, Boeck. in Flora, 1879, 562.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 1949!
Also in America, scattered from New York to Pernambuco.

14. **E. marginulata,** *Steud. Syn. Pl. Glum.* ii. 78. Glabrous. Rhizome woody. Stems 1–2 ft. long, subterete. Spikelet $\frac{1}{2}$ in. long, dense, pale reddish-green, sometimes proliferous at the base. Nut-bearing glumes in many spirals, ovate, obtuse. Hypogynous bristles 6, $\frac{2}{3}$ the length of the nut, retrorse-scabrous, pale rusty-brown. Style-branches 3. Nut less than $\frac{1}{2}$ the length of the glume, trigonous, obovoid, much narrowed at the top, yellow, or greenish; style-base small, conic, pallid.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.v. 598. *E. striata*, Hochst. ex Steud. Syn. Pl. Glum. ii. 78. *E. limosa*, A. Rich. Tent.Fl. Abyss. ii. 496, not of Schultes. *Heleocharis marginulata*, Boeck. in Linnæa, xxxvi. 457; Engl. Hochgebirgsfl. Trop. Afr. 149.

H. palustris, Boeck. in Linnæa, xxxvi. 466 partly, i.e. the African examples with 3-fid style; Engl. Hochgebirgsfl. Trop. Afr. 149 partly; Schweinf. in Bull. Herb. Boiss. ii. Append ii. 104.

Nile Land. Abyssinia: Tigre; marshes near Adowa, *Schimper*, 915! Shireh Province, *Quartin-Dillon*! Samen; Enjedcap, *Schimper*, 1331! Begemeder; Degai Meda, *Schimper*, 1213! and without precise locality, *Schimper*, 828! British East Africa: marshes in Mau district, 8000 ft., *Scott-Elliot*, 6931! foot of Mount Kenia at Ndoro, *Gregory* 78! River Harrington, *Gregory*, 53!

Imperfectly known species.

15. **E. naumanniana**, *Boeck. in Engl. Jahrb.* v. 92. A very slender flaccid olive-coloured water-plant, proliferously branched, 1½ ft. long. Stems copious and numerous, branches nearly capillary, clustered, terete or somewhat compressed, with septate nodes, often sterile; sheaths of the branches slender, membranous, narrow, yellow, perfectly glabrous in the mouth. Spikelet often proliferous from the base, very slender in flower, narrowly acuminate, linear, about ⅙ in. long, 1-flowered. Glumes 2, erect, scarcely unequal, thin membranous, sheathing, acuminate linear, 1-nerved, white ferruginous lineolate. Hypogynous bristles 0. Nut small, hardly more than ⅓ the length of the glume, broadly oval, narrowed at the base, triangular, angles somewhat obtuse sticking out, faces convex tessellated, brown, crowned by the persistent conical style-base constricted above the nut.—Boeck. in Engl. Gazelle Reise, Bot. 16.

Upper Guinea. Liberia: Monrovia, *Naumann* (ex *Boeckeler*).

In spite of the absence of hypogynous bristles and the style-base constricted above the nut, this plant would appear from the obvious characters nearly allied to *Scipus submersus*, Sauv. *cf.* C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 653.

9. FIMBRISTYLIS, Vahl; Benth. et Hook. f. Gen. Pl. iii. 1048, excluding sect. *Oncostylis*.

Spikelets of many perfect flowers, imperfect at the top, two lowest glumes empty. Fertile glumes in 3 or more spirals; or (Sect. *Abildgaardia*) the lower distichous. Hypogynous bristles 0. Stamens 3–1, anterior; anthers linear-oblong, muticous. Style 2-fid or 3-fid, sometimes villous, sometimes glabrous; style-base enlarged, distinct from the nut by a constriction or a line, continuous with and caducous with the style, not discoloured. Nut trigonous or biconvex, according as the style-branches are 3 or 2.—Glabrous or hairy. Rhizome 0, or not ½ in. long. Leaves generally present, sometimes 0. Inflorescence a terminal umbel, simple, compound or congested, or a single terminal spikelet.

Species 125, in nearly all hot and warm-temperate areas, especially plentiful in South-east Asia and North-east Australia.

*ELEOCHAROIDES.—Stem with 1 spikelet only, or with 2 by a rare accident; lower fertile glumes in many spirals, not subdistichous. Style 2-fid . . . . . 1. *F. polytrichoides*.

**DICHELOSTYLIS.—Stem with several (usually very many) spikelets ; style 2-fid ; lower fertile glumes in many spirals.

Nut linear-oblong ; glumes aristate . . . 2. *F. dipsacea.*
Nut obovoid.
Style-base with a ring of pendent hairs nearly as long as the nut . . . . . 3. *F. squarrosa.*
Style-base without long pendent hairs.
Nut conspicuously 8-ribbed lengthwise.
Glumes boat-shaped ; spikelet slightly polygonal . . . . . 4. *F. dichotoma.*
Glumes concave ; spikelets terete . . 5. *F. diphylla.*
Nut smooth, sometimes obscurely reticulate, scarcely ribbed.
Stem hairy at the top ; spikelets cuboid . 6. *F. pilosa.*
Stem glabrous at the top ; spikelets ovoid to cylindric.
Glumes at the upper half of the back grey by reason of minute depressed hairs. 7. *F. ferruginea.*
Glumes on the upper half of the back glabrous.
Spikelets 15–20 ; glumes obtuse . 8. *F. longiculmis.*
Spikelets 60–80 ; glumes acuminate . 9. *F. nigritana.*

***TRICHELOSTYLIS.—Stem with several or many spikelets ; style 3-fid ; lower fertile glumes in many spirals.

Spikelets not clustered.
Spikelets usually less than 12 to the umbel, except in *F. cioniana.*
Plants with fine long white hairs.
Nut with transverse wavy lines.
Nut large, whitish ; spikelets 3–14 . 10. *F. exilis.*
Nut smaller, yellowish ; spikelets 10–25 12. *F. cioniana.*
Nut not wavy, smaller than in *F. exilis* . 11. *F. Hensii.*
Plants without long white hairs, very nearly glabrous.
Glumes much acuminate ; spikelets subacute . . . . . 13. *F. tenera.*
Glumes obtuse ; spikelets obtuse, ellipsoid . 14. *F. schweinfurthiana.*
Spikelets nearly always more than 12 to the umbel.
Nut longitudinally striated, with transverse bars between the striations.
Spikelets broadly ellipsoid, obtuse . . 15. *F. miliacea.*
Spikelets ellipsoid-lanceolate . . . 16. *F. quinquangularis.*
Nut not longitudinally striate
Stem at the top subequally 4-angled or 5-angled.
Leaves very short, rarely 1–2 in. long . 17. *F. subaphylla.*
Leaves half the length of the stem . 18. *F. scabrida.*
Stem at the top very much flattened . 19. *F. complanata.*
Spikelets, at least many of them, clustered.
Spikelets very numerous in a compound umbel or head . . . . . 20. *F. obtusifolia.*
Spikelets 1–4 to each stem, subcapitate . . 21. *F. oligostachys.*

****ABILDGAARDIA.—Lower fertile glumes distichous or nearly so ; upper fertile glumes spirally placed ; spikelets not clustered.

Heads and whole plant nearly glabrous.
Nut pallid; spikelet 1 (rarely 2–3) to each stem . . . . . 22. *F. monostachya.*
Nut black-brown; spikelets 2–6 (rarely 1) to each stem . . . . . 23. *F. tristachya.*
Heads (as nearly the whole plant) hairy . . 24. *F. africana.*

1. **F. polytrichoides,** *R. Br. Prodr.* 226. Glabrous. Stem tufted, 4–8 in. long, slender. Leaves $\frac{1}{3}$–$\frac{2}{3}$ the length of the stem, scarcely $\frac{1}{20}$ in. broad. Spikelet 1, $\frac{1}{3}$ by $\frac{1}{8}$ in., ellipsoid-oblong. Glumes ovate, obtuse, dusky ferruginous; the lowest like the others, or bract-like, $\frac{1}{4}$–$\frac{1}{3}$ in. long, as though continuing the stem. Style 2-branched, a little shorter than the nut, nearly glabrous. Nut $\frac{1}{4}$ the length of the glume, obovoid, biconvex, smooth or obscurely scabrous on the shoulders, dark brown.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 632; K. Schum. in Engl. Pfl. Ost-Afr. C. 124. *Scirpus polytrichoides*, Retz. Obs. iv. 11.

Mozamb. Dist. Zanzibar, *Boivin!* **German East Africa:** Usambara; Tanga, *Holst*, 2123!

Also in India, Malaya, Chusan and Australia.

2. **F. dipsacea,** *Benth. in Benth. et Hook. f. Gen. Pl.* iii. 1049. Annual, almost glabrous. Stems 2–5 in. long. Leaves often as long as the stems, capillary. Umbel compound or simple, with 12–13 (occasionally with 2–1) spikelets; bracts capillary, often longer than the umbel. Spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. long, ovoid, dense. Glumes elliptic, long aristate, finally squarrose, pallid or greenish. Style 2-branched, short, glabrous; style-base small, conic, deciduous with the style. Nut a little shorter than the glume (exclusive of its arista), linear-oblong, slightly curved, pale brown, obscurely transversely wavy-lineolate, occasionally with a row of 4–6 large stalked loosely cellular glands on either margin.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 635, and in Durand & Schinz, Conspect. Fl. Afr. v. 604; Durand & Schinz, Études Fl. Congo, i. 301. *Scirpus dipsaceus*, Rottb. Descr. et Ic. 56, t. 12, fig. 1; Boeck. in Linnæa, xxxvi. 736, and in Engl. Gazelle Reise, Bot. 16. *Echinolytrum dipsaceum*, Desv. Journ. Bot. i. 21, t. 1. *Isolepis dipsacea*, Roem. & Schultes, Syst. Veg. ii. 119; Kunth, Enum. ii. 205. *I. elachista*, Schultes in Roem. & Schultes, Syst. Veg. ii. Mant. 61; Kunth, Enum. ii. 217.

Lower Guinea. Lower Congo: mouth of the River Kwa, 1000 ft., *Hens*, C, 118! Kinchassa, on Stanley Pool, *Luja*, 174 partly!

Also in India, Malaya, and China, extending to Amur.

3. **F. squarrosa,** *Vahl, Enum.* ii. 289. Annual, pubescent or glabrous. Stems 2–7 in. long, tufted. Leaves $\frac{1}{2}$–$\frac{3}{4}$ the length of the stem, setaceous or narrowly linear. Umbel usually compound (but depauperated examples occur with few or only 2 spikelets to a stem); bracts 3–4, similar to the leaves, often nearly as long as the umbel.

Spikelets all solitary, up to $\frac{1}{4}$ by $\frac{1}{12}$ in., densely flowered, dusky straw-coloured. Glumes elliptic; nerves 3–5 on the back, uniting into a strong recurved bristle. Stamens usually 2. Style small, with 2 branches, hairy below the bifurcation; style-base with a ring of 10–18 large pendent sub-1-cellular hairs, white-hyaline, often reaching nearly to the base of the nut, deciduous with the nut. Nut $\frac{1}{2}$ the length of the glume exclusive of its bristle, obovoid, biconvex.—Kunth, Enum. ii. 224; Boeck. in Linnæa, xxxvii. 10; Schweinf. Pl. Nilot. 42; Coss. & Durieu, Expl. Scient. Algér. Glum. 233; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 149; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 635, in Durand & Schinz, Conspect. Fl. Afr. v. 609, and in Dyer, Fl. Cap. vii. 200; Durand & Schinz, Études Fl. Congo, i. 303; Urban, Symb. Antill. ii. 76; Rendle in Cat. Afr. Pl. Welw. ii. 122. *F. æstivalis*, Boeck. in Flora, 1879, 564, and in Engl. Gazelle Reise, Bot. 17. *Scirpus squarrosus*, Poir. Encycl. Suppl. v. 100, not of Linn.

Upper Guinea. Senegambia, *Leprieur!* Gambia, *Heudelot*, 561! Sierra Leone, *Scott-Elliot*, 5324! Niger Territory: Nupe, *Barter*, 1580!

Nile Land. British East Africa: Jur; Majob, *Schweinfurth*, 1549! by the River Wau, 1638 partly! White Nile, *St. Auge!*

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 1404! 1428! Kinchassa, on Stanley Pool, *Luja*, 174 partly! Lukungu, 700 ft., *Hens*, 16! and without precise locality, *Smith!* Angola: Dande; banks of a lake near Bombo, *Welwitsch*, 6997!

Mozamb. Dist. British Central Africa: near the River Zambesi, *Menyharth*, 104!

Scattered nearly throughout the world, exclusive of North America.

4. **F. dichotoma,** *Vahl, Enum.* ii. 287. A pubescent or puberulous annual. Stems tufted, 2–10 in. long. Leaves as long as the stem, setaceous or linear. Umbel compound, usually with very many spikelets; bracts 3–4, similar to the leaves, as long as the umbel. Spikelets solitary, $\frac{1}{4}$ in. long, cylindric, oblong or hardly ellipsoid, many-flowered, ferruginous, obscurely polygonal by reason of the keeled glumes. Fertile glumes in many spirals, ovate, acute, glabrous, keel green or yellowish. Style flattened, dilated at the base, pubescent on its margins nearly to the base; branches 2, linear. Nut obovoid, $\frac{1}{3}$ the length of the glume, biconvex (the anticous angle being flattened), white (in a few examples discoloured, perhaps in drying); superficial cells oblong, superposed in vertical series, so that the nut appears to have 5–9 longitudinal ribs on each face.—Kunth, Enum. ii. 225; Boeck. in Peters, Reise Mossamb. Bot. 544, in Flora 1879, 564, and in Linnæa, xxxvii. 12 partly; A. Rich. Tent. Fl. Abyss. ii. 504; Schweinf. Pl. Nilot. 42, and Beitr. Fl. Aethiop. 216; Coss. & Durieu, Expl. Scient. Algér. Glum. 233; Daveau in Bolet. Soc. Brot. ix. 77; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 635, in Durand & Schinz, Conspect. Fl. Afr. v. 602, and in Dyer, Fl. Cap. vii. 200; Zarb, Cat. Spéc. Bot. Pfund, 39; K. Schum. in Engl. Pfl. Ost-Afr. C. 124; Durand & Schinz, Études Fl. Congo, i. 300. *F. squarrosa*, A. Rich. Tent. Fl. Abyss. ii. 503 (cf.

Boeck. in Flora, 1860, 35), not of Vahl. *Scirpus dichotomus*, Linn. Sp. Pl. ed. ii. 74; Rottb. Descr. et Ic. 57, t. 13, fig. 1.

Upper Guinea. Senegal, *Perrottet*, 834! *Lécard*, 23! Niger Territory: Nupe; banks of the River Niger, *Barter*, 1209! Bornu, *Oudney*, 6!

Nile Land. Nubia, *Letourneux*, 309 A! Sennar, *Hartmann!* Dongola, *Pfund*, 617! Tuti Island, near Khartoom, *Schweinfurth*, 848! *Kotschy*, 328! Galabat: region of Matamma, *Schweinfurth*, 2042! Abyssinia: Sabra, *Schimper*, 533! River Tacazze, *Schimper*, 691! 1577! and without precise locality, *Schimper*, 267 *in Herb. Paris!* British East Africa: White Nile, *Schweinfurth*, 917! Ukamba; banks of the River Adi, *Hildebrandt*, 2624!

Lower Guinea. Lower Congo; Stanley Pool, *Demeuse!* Kimuenza, *Gillet*, 1906!

Mozamb. Dist. Portuguese East Africa: Mozambique, *Peters*, 8! Lower Zambesi; Shigogo, *Kirk!* Expedition Island, *Kirk!* British Central Africa: Zambesi Valley, near Boruma, *Menyharth*, 1065! Nyasaland; near Nsessi River, *Scott!* near Karonga, *Scott!*

Throughout the hot and warm temperate regions of the Old World and Australia.

5. **F. diphylla,** *Vahl, Enum.* ii. 289. A pubescent, puberulous or glabrous annual. Stems tufted, 4–28 in. long. Leaves $\frac{1}{3}$–$\frac{2}{3}$ the length of the stem, linear or rarely $\frac{1}{6}$–$\frac{1}{4}$ in. broad. Umbel compound, of many (sometimes of few) spikelets; bracts 3–4, similar to the leaves, shorter or longer than the umbel. Spikelets solitary, $\frac{1}{4}$–$\frac{1}{2}$ in. long, ellipsoid-lanceolate, many-flowered, straw-coloured, ferruginous, brown or much variegated with chestnut, terete. Fertile glumes concave, hardly keeled, acute, often minutely ciliate on the margins. Style longish, dilated at the base, flattened, villous on the margins; branches 2, linear. Nut obovoid, $\frac{1}{3}$ the length of the glume, biconvex, white or somewhat yellowish, with 5–13 longitudinal ribs on each face—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 636, in Durand & Schinz, Conspect. Fl. Afr. v. 603, and in Dyer, Fl. Cap. vii. 200; K. Schum. in Engl. Pfl. Ost-Afr. C. 124; Durand & Schinz, Études Fl. Congo, i. 301; Urban, Symb. Antill. ii. 77; Rendle in Cat. Afr. Pl. Welw. ii. 122. *F. laxa*, Vahl, Enum. ii. 292; Kunth, Enum. ii. 232. *F. communis*, Kunth, Enum. ii. 234 mainly; Benth. in Hook. Niger Fl. 554; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 150 partly. *F. fuscata*, Steud. Syn. Pl. Glum. ii. 112. *F. debilis*, Steud. l.c. 109. *F. tertia*, Steud. ex Jardin in Mém. Soc. Sc. Nat. Cherb. v. (1857) 299. *F. polymorpha*, Boeck. in Vidensk. Meddel. Kjob. 1869, 141, 158, in Linnæa, xxxvii. 14 (excl. some synonyms), in Flora, 1879, 564, and in Engl. Gazelle Reise, Bot. 17; Engl. Hochgebirgsfl. Trop. Afr. 149. *F. squamulosa*, Hochst. ex Boeck. in Linnæa, xxxvii. 15. *Scirpus diphyllus*, Retz. Obs. v. 15. *S. annuus*, Allioni, Fl. Pedem. ii. 277, t. 88, fig. 5; Desfont. Fl. Atlant. i. 51.

Upper Guinea. Senegambia, *Heudelot! Leprieur!* Sierra Leone, *Afzelius! Morson! Barter! Mann*, 892! *Scott-Elliot*, 3917! 5157! *Welwitsch*, 6991! French Guinea: Farana, *Scott-Elliot*, 5355! Upper Volta, at Salaga, *Krause!* Niger Territory: Aboh, *Barter*, 131! Nupe, *Barter*, 1581! River Nun, *Mann*, 1888! Old Calabar; *Robb!* Ogurude, *Holland*, 275! Cameroons: Sanega, *Zenker*, 1438! Fernando Po, *Vogel*, 12!

Nile Land. Upper Sennar; Fazokl, *Kotschy*, 575! Abyssinia: Begemeder' *Schimper*, 1250! British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 1434! ser. iii. 196! Jur Ewet (Awet), *Schweinfurth*, 1765! Bongo; Addai, *Schweinfurth*, 1446! Ruwenzori; Kasamaga, 5000 ft., *Scott-Elliot*, 7539! Losuguta, *Gregory*, 51! Ukamba, 4000 ft., *Scott-Elliot*, 2344! 6476!

Lower Guinea. Gaboon: Gaboon River, *Mann!* Munda, *Soyaux*, 335! 354! Lower Congo: Kisantu, *Gillet*, 416! 524! 625! 1317! Leopoldville, *Luja*, 67! Kinchassa, *Luja*, 177! and without precise locality, *Smith!* Loango, *Jardin* Angola: Pungo Andongo district, *Welwitsch*, 6823 B! 6827 partly! 6830, C and D! 6832! 6834! 6835 B! 7169! Ambriz, *Welwitsch*, 7002! Golungo Alto district, *Welwitsch*, 7017! 7019! Ambaca district, *Welwitsch*, 7018!

South Central. Congo Free State, *Dupuis*, 52! *Demeuse*, 154!

Mozamb. Dist. Zanzibar, *Boivin!* *Hildebrandt*, 1060! German East Africa: Zanguebar, *Kirk*, 94! Usambara; Derema (Nderema), *Holst*, 2231! Kilimanjaro, 6000 ft., *Johnston!* British Central Africa: Nyasaland; Fort Hill, on the Tanganyika Plateau, *Whyte!* Kondowe to Karonga, 2000–6000 ft., *Whyte* Zomba Plains, 2500–3000 ft., *Whyte!* Zomba Rock, *Whyte!* Shire Highlands, *Scott-Elliot*, 8573 B! *Buchanan*, 11!

Very common and widely spread throughout the hot and warm-temperate regions of the world.

Some closely allied plants, esteemed mere forms of *F. diphylla* by Kunth and Boeckeler, are here regarded as distinct; even thus narrowed down, our *F. diphylla*, has 140 names. It should, moreover, be understood that *F. diphylla* is so close to the preceding *F. dichotoma* that different cyperologists sort the material, as between these two, differently. The examples from Tropical Africa, above referred to *F. diphylla*, do not match, so that the species might be further subdivided.

6. **F. pilosa,** *Vahl, Enum.* ii. 290. Stem hairy at the top. Umbel of 6–20 spikelets, nearly simple. Spikelets $\frac{1}{5}$ in. wide, cuboid. Glumes quadrate, often pubescent on the back. Style 2-fid. Nut obovoid, biconvex, shining white, smooth, somewhat reticulate but not ribbed; otherwise as *F. diphylla*.—Schumach. Beskr. Guin. Pl. 32; Kunth, Enum. ii. 235 in note (i.e. his plant "spicis robustioribus ellipticis obtusis"); Rendle in Cat. Afr. Pl. Welw. ii. 122. *F. castanea*, var. *thonningiana*, Boeck. in Linnæa, xxxvii. 19. *F. communis*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 150 partly; K. Schum. in Engl. Pfl. Ost-Afr. C. 124. *Scirpus pilosus*, Poir. Encycl. Suppl. v. 101, not of Retz.

Upper Guinea. Without precise locality, *Thonning!* Isert! *Hofmanbarg!*

Nile Land. British East Africa: Mombasa, *Taylor*.

Lower Guinea. Angola: Pungo Andongo; Pedras de Guinga, *Welwitsch*, 6827 partly!

In this genus, no name has been so misapplied and confused both in the text-books and in the herbaria as *F. pilosa*. The hairy forms (or varieties) of *F. diphylla* are numerous and abundant, especially in Malaya; and these are often named in herbaria, probably by guess from the name, *F. pilosa*, Vahl (which they are not); and this is the plant reduced correctly by Kunth, Boeckeler, &c. to *F. diphylla*, Vahl. The true *F. pilosa*, Vahl has not been much collected, and differs much, essentially in the non-trabeculate nut. The name *F. pilosa*, K. Schumann, is merely a book synonym for the earlier *F. africana*, Durand & Schinz, below, a species of another section.

7. **F. ferruginea,** *Vahl, Enum.* ii. 291. Flowering the first year, as in most other species of *Fimbristylis*, but frequently biennial, and perhaps perennial. Stems densely tufted, 8–28 in. long; roots wiry, fibrous. Leaves usually short or hardly any, sometimes $\frac{1}{3}$ the length of the stem, hairy or glabrous. Umbel of 5–10 (rarely of 20) spikelets, simple or slightly compound; bracts shorter, usually much shorter, than the umbel. Spikelets solitary, $\frac{2}{5}$ by $\frac{1}{6}$ in., ovoid-oblong, densely flowered, ferruginous, more or less variegated by chestnut-brown or green. Glumes ovate, in the upper half of their back grey puberulous. Style longer than the nut, flattened, villous on the margins, base dilated; branches 2, linear-lanceolate. Nut nearly $\frac{1}{2}$ the length of the glume, obovoid, biconvex, smooth, pale yellow becoming brown; superficial cells subquadrate.—Delile, Fl. Égypte, 10, t. 6, fig. 3; Kunth, Enum. ii. 236; Benth. in Hook. Niger Fl. 554; Boeck. in Peters, Reise Mozamb. Bot. 544, in Linnæa, xxxvii. 16, in Flora, 1879, 564, and in Engl. Gazelle Reise, Bot. 17; Schweinf. Beitr. Fl. Aethiop.216; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 149; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 638, in Durand & Schinz, Conspect. Fl. Afr. v. 606, in Bull. Herb. Boiss. iv. Append. iii. 31, and in Dyer, Fl. Cap. vii. 201; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 51; K. Schum. in Engl. Pfl. Ost-Afr. C. 124; Durand & Schinz, Études Fl. Congo, i. 302. Urban, Symb. Antill. ii. 78; Rendle in Cat. Afr. Pl. Welw. ii. 122, incl. var. *graminea*. *F. lomentocarpa*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 504. *Scirpus ferrugineus*, Linn. Sp. Pl. ed. ii. 74.

Upper Guinea. Senegambia, *Brunner*, 90! 150! Senegal, *Perrottet*, 835! *Leprieur!* *Heudelot*, 449! 452! Gambia, *Don!* Cape Verd Isles, *Perrottet!* *Lowe!* *St. Hilaire!* *Bolle!* Liberia: Grand Bassa, *Vogel*, 55! Niger Territory: Oware, *Beauvois!* Nun River, *Vogel*, 36! *Mann*, 531!

Nile Land. Soudan, *Oudney*, 4! Gallabat, *Schweinfurth*, 2035! 2037! Abyssinia, *Schimper*, 532! 1317! British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2121!

Lower Guinea. Island of St. Thomas, *Rattray!* Lower Congo, Kisantu, *Gillet*, 1585! 1598! and without precise locality, *Smith!* Angola: St James Island, *Welwitsch*, 7105! Mossamedes; in dried up lakes by the River Caroca, *Welwitsch*, 6970!

South Central. Congo Free State: *Dupuis!*

Mozamb. Dist. Zanzibar, *Boivin!* *Taylor!* German East Africa: Usambara; Tanga, *Holst*, 2122! Muoa, *Holst*, 3050! Portuguese East Africa: Mozambique, *Peters*, 8! *Kuntze*, 203! British Central Africa: Boruma, on the Zambesi, *Menyharth*, 1056!

In tropical and warm temperate countries nearly throughout the world; specially abundant near the sea.

8. **F. longiculmis,** *Steud Syn. Pl. Glum.* ii. 110. Stems 3–4 ft. long, robust. Umbel compound, of 15–20 spikelets. Spikelets solitary, $\frac{3}{5}$ by $\frac{1}{5}$ in., cylindric, rigid, much variegated with chestnut-colour. Glumes glabrous on the back, sometimes very minutely hairy on the margin; otherwise as *F. ferruginea*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 607; K. Schum. in Engl. Pfl. Ost-Afr. C. 124. *F. zansibarensis*, Boeck. in Flora, 1880, 437.

Nile Land. British East Africa: Mombasa, *Taylor!*

Mozamb. Dist. Zanzibar, *Kirk ! Hildebrandt*, 1058B !

This species is as though a very large form of *F. ferruginea*. It differs in the glumes being glabrous on the back, and in the larger, harder, darker-coloured spikelets.

9. **F. nigritana,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 608. Glabrous. Stems exceeding 2 ft. in length. Umbel compound, large, with 74 spikelets; bracts 1–1½ in. long. Spikelets solitary, up to ½ by ⅙ in., dull chestnut-coloured. Glumes ovate, acuminate, acute mucronate; otherwise as *F. longiculmis* (or large *F. ferruginea*).

Upper Guinea. Niger Territory: Nupe, *Barter*, 623 !

This species is very near *F. spadicea*, Vahl, a native of Tropical America, from which it mainly differs in the glumes being conspicuously acuminate.

10. **F. exilis,** *Roem. & Schultes, Syst. Veg.* ii. 98. Annual, hairy. Stems tufted, 4–16 in. long, rather slender, usually with patent hairs scattered through their whole length, but sometimes nearly glabrous. Leaves ⅓–½ the length of the stem, up to $\frac{1}{12}$ in. broad, hairy or glabrate, sheaths always hairy. Umbel of 3–14 pedicelled spikelets; bracts 4–3, about as long as the umbel. Spikelets ¼–⅓ by ⅛ in., 10–12-flowered, pale ferruginous usually much tinged with chestnut. Glumes ovate, acute, pubescent; keel green, excurrent into a mucro. Stamens 3–2. Style rather shorter than the nut, nearly glabrous; branches 3; base dilated, subpyramidal, horizontally truncate, with a constriction above the nut. Nut rather large, often ½ the length of the glume, trigonous or triquetrous, obovoid or narrowed much at the base so as to be pyriform, transversely wrinkled, smooth or obscurely tubercled, passing from white to pale brown.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 604 partly, in Bull. Herb. Boiss. iv. Append. iii. 31, and in Dyer, Fl. Cap. vii. 201; Durand & Schinz, Études Fl. Congo, i. 301; Durand & De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 89; Urban, Symb. Antill. ii. 80; Rendle in Cat. Afr. Pl. Welw. ii. 123. *F. hispidula*, Kunth, Enum. ii. 227; Benth. in Hook. Niger Fl. 554; Boeck. in Peters, Reise Mossamb. Bot. 545, in Linnæa, xxxvii. 27, in Flora, 1879, 564, and in Engl. Gazelle Reise, Bot. 17; Schweinf. Beitr. Fl. Aethiop. 216; Oliver in Trans. Linn. Soc. xxix. 168; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 152; K. Schum. in Engl. Pfl. Ost-Afr. C. 124. *F. rivularis*, Steud. Syn. Pl. Glum. ii. 109. *F. vestita*, Steud. Syn. Pl. Glum. ii. 112. *F. Hildebrandtii*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 155; K. Schum. in Engl. Pfl. Ost-Afr. C. 125. *Scirpus hispidulus*, Vahl, Enum. ii. 276; Schumach. Beskr. Guin. Pl. 31. *S. Hildebrandtii*, Boeck. in Flora, 1875, 263. *S. granulato-hirtellus*, Boeck. in Verh. Bot. Ver. Brandenb. xxxi. 179. *Isolepis Perrottetii* and *I. consocialis*, Steud. Syn. Pl. Glum. ii. 318. *I. pubiculmis*, Hochst. ex C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 605. *Trichelostylis* sp., T. Thoms. in Speke, Nile, Append. 654. *T. pilosula*, Nees ex Boeck. in Linnæa, xxxvii. 28. *T. schimperiana*, Hochst. ex Boeck. in Linnæa, xxxvii. 28.

Upper Guinea. Senegal, *Sieber*, 4 ! 102 ! *Roger*, 114 ! *Perrottet*, 311 !

831! 832! 836! Upper Senegal, *Lécard*, 92! 105! Senegambia: Galam, *Heudelot*, 330! 388! Cape Verd, *St. Hilaire!* Sierra Leone, *Afzelius! Scott-Elliot*, 5181! Liberia; Grand Bassa, *Ansell!* Pandiaki, *Ansell!* Dahomey; *Newton*, 6! 33! Bornu, *Vogel*, 22! Lagos, *Millen*, 105! Niger Territory: Nupe, *Baikie! Barter*, 1576! Lokaja district, *Richardson*, 5! Lower Niger; Aboh, *Barter*, 356! Attah, *Vogel*, 91! Cameroons: Cameroon River, *Mann*, 778! Batanga, *Bates*, 105! Yaunde, *Zenker & Staudt*, 554! *Zenker*, 1504!

Nile Land. Kordofan, *Pfund*, 28! 638! *Kotschy*, 15! Darfur, *Pfund*, 605! 639! Galabat, *Schweinfurth*, 2030! 2031! 2032! Abyssinia, *Schimper*, 232! 363! 846 partly! 1318! 1590! 2165! *Hildebrandt*, 356! *Quartin-Dillon*, 125! Somaliland, *Mrs. Lort-Phillips!* Nile Sources, *Sabatier!* British East Africa: Kitch; Ador, *Petherick!* Jur; Jur Ghattas, *Schweinfurth*, 2122! Ruwenzori, *Scott-Elliot*, 7624! Uganda, *Scott-Elliot*, 7388! Mount Kenia, *Gregory*, 87! Ukamba, *Hildebrandt*, 2655 partly! Machakos, *Scott-Elliot*, 6383! Ongalea Mountains, *Gregory*, 14! Tana, *Gregory*, 97! Mombasa, *Boivin! Hildebrandt*, 2023!

Lower Guinea. Lower Congo, *Smith! Hens*, 13! Kisantu, *Gillet*, 588! Angola; *Welwitsch*, 6826! 6984! 7012B! 7152! 7161! Loanda, *Welwitsch*, 6983! 6985! 6986! 6996! 6998B! and 6998C! Pungo Andongo, *Welwitsch*, 6822! 6823! 6831! 6833! 6998! Huilla, *Welwitsch*, 6946! 6953! 6954! 6956! 6957! Ambriz, *Welwitsch*, 7001! Amboland; *Schinz*, 372!

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1059! 1200! 7059! German East Africa: Usambara; Tanga, *Holst*, 2006! 2080! Amboni, *Holst*, 2743! Unyamwezi; Mininga, *Speke & Grant*, 166! Portuguese East Africa: Mozambique, *Peters*! *Kirkson!* Kongoni River, *Kirk!* Lower Zambesi, between Lupata and Tete, *Kirk!* Shupanga, *Kirk!* British Central Africa: Boruma, *Menyharth*, 555A partly! 555B! 660! 664! Nyasaland; Shire Highlands, *Scott-Elliot*, 8573! *Buchanan*, 43! and without precise locality, *Buchanan*, 462! 1194! Ngamiland; between Koobie (Kobis) and North Shaw Valley, *Baines!* Kwebe, *Lugard*, 164!

Also common in South Africa and the Mascarene Islands. Rare in Tropical America.

This is one of the commonest *Cyperaceae* of Tropical Africa; and varies greatly in size, development, hairiness, and colour of glumes. The ordinary hairy form is also frequently put with various species of *Bulbostylis*. The present (and 2 following) species, while approaching *Bulbostylis* in habit, show no approach to the style-base of *Bulbostylis*.

Var. *oligostachya*, C. B. Clarke. Small and weak, hairy or glabrate. Stems 1–4 in. long, bearing 1 or 2 spikelets only. Nut obovoid, subsessile, hardly $\frac{1}{2}$ the size of the nut of typical *F. exilis*; style deciduous, carrying the style-base with it, so that no discoloured button is left behind on the nut.

Nile Land. Abyssinia: Adowa, *Schimper*, 299 partly! Somaliland; Abdallah, *Keller*, 83! 89! Thuja Steppe, *Keller*, 86! Ogaden Steppe, *Keller*, 91! Warandab, *Keller*, 96!

11. **F. Hensii,** *C. B. Clarke.* Nut rather small, pallid, smooth, not transversely wavy; otherwise as *F. exilis.*—*F. exilis*, var. *levinux*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 605; Durand & Schinz, Études Fl. Congo, i. 302.

Lower Guinea. Loango; *Soyaux*, 151! Lower Congo: Stanley Pool and Lutete, *Hens*, 62! 67! 74! 75! 239! *Demeuse!*

South Central. Congo Free State: Bolongo Cataracts, *Luja*, 134!

As throughout the Order *Cyperaceae*, the apparently transverse wrinkles or wavy lines on the nut of *F. exilis*, are due to the longitudinally oblong superficial cells, the ends of which (by a thickening at their junction) give the appearance of transverse wrinkles. *F. Hensii* shows none such; because the superficial cells are nearly quadrate.

12. **F. cioniana,** *P. Savi in Memor. Valdarn.* iii. (1842) 98, *with a figure.* Umbel rather dense, of 10–25 spikelets. Spikelets $\frac{1}{8}$–$\frac{1}{5}$ in. long, pale ferruginous. Points of the glumes rather long, suberect. Nut small, yellowish, with transverse wavy lines; otherwise as *F. exilis.*—Parl. Fl. Ital. ii. 74; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 602; Durand & Schinz, Études Fl. Congo, i. 299. *F. lioniana*, Steud. Syn. Pl. Glum. ii. 112. *F. hispidula*, var. *cioniana*, Boeck. in Linnæa, xxxvii. 28.

Upper Guinea. Niger Territory: Aboh, *Barter*, 132! Nupe, *Barter*, 127! 1211!

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2122 partly!

Lower Guinea. Lower Congo: Lutete and Lukungu, *Hens*, 36! 185! 303! Stanley Pool, *Demeuse*, 155! *Luja*, 70!

South Central. Congo Free State: Lusambo, on the River Sankuru, *Duchesne.*

Also in rice-fields in Italy.

13. **F. tenera,** *Roem. & Schultes, Syst. Veg.* ii. *Mant.* 57. Annual, glabrous, except the glumes. Stem slender, 8 in. long. Leaves $\frac{1}{2}$ the length of the stem, $\frac{1}{20}$–$\frac{1}{12}$ in. broad. Umbel loose, subcompound, of 7–10 solitary spikelets; bracts 2–3, setaceous, shorter than the umbel. Spikelets ellipsoid-lanceolate, nearly $\frac{1}{4}$ in. long, $\frac{1}{12}$ in. broad, 10-flowered. Glumes ovate, acuminate, submucronate, boat-shaped, adpressed, glandular-puberulous, chestnut-red, keel yellow, margins conspicuously scarious. Style 3-fid, longer than the nut, deciduous together with its pyramidal base, glabrous. Nut hardly $\frac{1}{2}$ the length of the glume, obovoid, round-trigonous, white or pallid, coarsely reticulate, smooth or sometimes subtubercled.—Kunth, Enum. ii. 245; Boeck. in Linnæa, xxxvii. 26; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 642, and in Durand & Schinz, Conspect. Fl. Afr. v. 610. *F. muriculata*, Benth. in Hook. Niger Fl. 554. *F. muricata*, Walp. Ann. iii. 688. *F. muricatula*, Steud. Syn. Pl. Glum. ii. 113.

Upper Guinea. Senegambia, *Leprieur!* Edge of the Sahara, *Heudelot*, 324! Gold Coast: Accra, *Don!*

The typical *F. tenera* has only been seen from West Tropical Africa. The varieties β *oxylepis* (*F. oxylepis*, Steud. Syn. Pl. Glum. ii. 110) and γ *obtusata* C. B. Clarke (in Hook. f. Fl. Brit. Ind. vi. 642), are not rare in India and Malaya.

14. **F. schweinfurthiana,** *Boeck. in Flora*, 1879, 565. Annual, glabrous. Stems tufted, 8–12 in. long, slender; basal sheaths fimbriate, fuscous. Leaf on the uppermost sheath $\frac{1}{2}$ the length of the stem, $\frac{1}{20}$–$\frac{1}{12}$

in. broad. Umbel loose, subcompound, of 2–9 spikelets; bracts 2–3, $\frac{1}{2}$ in. long. Spikelets $\frac{1}{5}$ by $\frac{1}{8}$ in., rather dense, dull brown. Glumes ovate, obtuse, sometimes minutely apiculate. Style shorter than the nut, nearly glabrous, deciduous together with the small pyramidal base; branches 3, long. Nut less than $\frac{1}{2}$ the length of the glume, obovoid, smooth or nearly so, brown.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 609.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 1824!

Var. *angustior*, C. B. Clarke. Slender. Stems and leaves conspicuously dotted. Umbel simple, depauperated. Nut somewhat tubercled.

Upper Guinea. Soudan, *Lécard*, 111!

15. **F. miliacea,** *Vahl, Enum.* ii. 287. A glabrous annual. Stems 8–24 in. long, tufted, often flattened at the base with apparently distichous leaves, at the top with 4–5 equal angles. Leaves usually $\frac{1}{2}$ the length of the stem, sometimes overtopping the stem, sometimes 0, narrowly linear. Umbel compound, often 6 in. in diam., with 60–100 solitary spikelets; bracts about 1 in. long. Spikelets $\frac{1}{12}$ in. in diam., globose or short-cylindric, obtuse. Style 3-fid. Nut less than $\frac{1}{2}$ the length of the glume, obovoid, with delicate transverse bars in vertical series, straw-coloured or pale brown, smooth or more or less tubercled. —Kunth, Enum. ii. 230; Boeck. in Linnæa, xxxvii. 43; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 644, and in Durand & Schinz, Conspect. Fl. Afr. v. 607; K. Schum, in Engl. Pfl. Ost-Afr. C. 124; Urban, Symb. Antill. ii. 81. *Scirpus miliaceus*, Thunb. Fl. Japon. 37, not of Linn. *Scirpus* sp. n. 77, Rottb. Descr. et Ic. 57, t. 5, fig. 2.

Upper Guinea. Senegambia, *Heudelot*, 212! 327! 389!

Mozamb. Dist. Zanzibar, *Boivin!*

Common in the Mascarene Islands and throughout all tropical and subtropical areas, except Africa, whence only the above collections have been seen.

16. **F. quinquangularis,** *Kunth, Enum.* ii. 229. Spikelets $\frac{1}{8}$–$\frac{1}{5}$ by $\frac{1}{10}$ in., ellipsoid-lanceolate, and 6–15-flowered; otherwise as *F. miliacea*. —Boeck. in Linnæa, xxxvii. 42; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 644, and in Durand & Schinz, Conspect. Fl. Afr. v. 609. *Scirpus quinquangularis*, Vahl, Enum. ii. 279.

Upper Guinea. Sierra Leone: Falaba, *Scott-Elliot*, 5166!

Lower Guinea. Congo Free State: Lower Congo; Kisantu, *Gillet!*

Also in Mauritius, India, South-East Asia, Queensland, Guiana. A rice-field weed, indigenous perhaps in India, occasionally collected in nearly all parts of the world.

17. **F. subaphylla,** *Boeck. in Flora*, 1879, 565. Glabrous. Stems 12–16 in. long, approximate on a very short woody rhizome, at the top 4-angular and more or less flattened. Leaves usually $\frac{1}{2}$ in., sometimes up to 2 in., long. Umbel 2–4 in. in diam., with 30–60 spikelets; bracts 2–3, less than 1 in. long. Spikelets $\frac{1}{3}$ by $\frac{1}{12}$ in., 5–14-flowered, cinnamon-brown. Style longer than the nut, glabrous, deciduous together

with its small style-base; branches 3. Nut hardly $\frac{1}{3}$ the length of the glume, obovoid, white or yellowish, smooth or verrucose, but hardly transversely trabeculate.—K. Schum. in Engl. Pfl. Ost-Afr. C. 124; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 610.

Nile Land. British East Africa: Gazelle River, *Schweinfurth*, 1144! 1155! 1236!

Examples of *F. miliacea* and *F. quinquangularis* occur with very short leaves; the present plant differs from both by the outer cells of the nut being very shortly elliptic (almost round) so that the nut does not appear marked by series of bars.

18. **F. scabrida,** *Schumach. Beskr. Guin. Pl.* 32. Glabrous or very nearly so. Stems 12–16 in. long, tufted, thickened at the base by the black torn leaf-sheaths, at the top obscurely compressed, sometimes scabrous, sometimes quite smooth. Leaves $\frac{1}{2}$ the length of the stem, up to $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Umbel simple, 2–6 in. in diam., with 12–40 spikelets; bracts 3–4, short, sometimes up to 1–1$\frac{1}{2}$ in. long. Spikelets $\frac{1}{4}$ by $\frac{1}{8}$ in., ellipsoid, 4–12-flowered, pale chestnut-marked. Glumes ovate, acute, mucronate. Style nearly as long as the nut, glabrous, deciduous with the narrow-pyramidal base; branches 3 (or 2 occasionally seen in the upper part of the spikelet). Nut less than $\frac{1}{2}$ the length of the glume, obovoid, straw-yellow, verrucose, not (or obscurely) transversely barred.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 609; Durand & Schinz, Études Fl. Congo, i. 303. *F. Barteri* and *F. mucronata*, Boeck. in Linnæa, xxxvii. 33, 41.

Upper Guinea. Upper Senegal, *Lécard*, 120! Guinea, *Thonning!* Lagos: Wasimi Road, *Lagos Government* 50! Niger Territory: Nupe, *Barter*, 1578! 1582!

South Central. Congo Free State: Monbuttu; at the River Welle, *Schweinfurth*, 3517!

19. **F. complanata,** *Link, Hort. Berol.* i. 292. Glabrous. Stems 8–24 in. long, at the top quadrangular and much flattened, i.e. usually with 2 sharp edges and a rib on each of the flat faces. Leaves usually 3–8 in. long, $\frac{1}{6}$–$\frac{1}{5}$ in. broad, suddenly narrowed at the tip. Umbel up to 4–5 in. in diam., with 180 spikelets, commonly with 30–70 spikelets, also small examples with 12–30 spikelets are not rare; bracts 2, suberect, usually 1–2 in. long, similar to the leaves and similarly suddenly narrowed at the top. Spikelets $\frac{1}{4}$ by $\frac{1}{10}$ in., brown or chestnut-coloured. Glumes ovate, obtuse or acute. Style as long as the nut, glabrous, deciduous together with the pyramidal style-base; branches 3. Nut very small, hardly $\frac{1}{3}$ the length of the glume, obovoid, straw-coloured; outermost cells short-elliptic and transverse, but the nut hardly striated or transversely barred.—Kunth, Enum. ii. 228; A. Rich. Tent. Fl. Abyss. ii. 505; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 150; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 646, in Durand & Schinz, Conspect. Fl. Afr. v. 602, and in Dyer, Fl. Cap. vii. 202; K. Schum. in Engl. Pfl. Ost-Afr. v. 124; Durand & Schinz, Études Fl. Congo, i. 300; Urban, Symb. Antill. ii. 81; Rendle in Cat. Afr. Pl. Welw. ii. 123.

F. autumnalis, Boeck. in Linnæa, xxxvii. 38. *Scirpus complanatus*, Retz. Obs. v. 14.

Nile Land. Abyssinia: by the stream Mai Fra, near Adowa, *Schimper*, 148! 858! around Assai, *Quartin-Dillon!*

Lower Guinea. Lower Congo: Stanley Pool, *Demeuse*, 145! Angola: Pungo Andongo; banks of streams near Luxillo, *Welwitsch*, 6835! Huilla; near Eme, *Welwitsch*, 6971!

The typical form of this species is common in nearly all tropical and subtropical areas; but the varieties, subspecies, and allied species of this are numerous, and variously arranged by authors.

20. **F. obtusifolia,** *Kunth, Enum.* ii. 240. Glabrous. Stems 4–16 in. long. Leaves 2–8 by $\frac{1}{8}$–$\frac{1}{6}$ in., very rigid, in the dried state concavo-convex, suddenly narrowed at the top. Umbel compound, the spikelets generally in capitate clusters (2–5 together) on the ultimate rays, but the umbel is not rarely very close or appearing as one dense head; bracts 3–2, lowest $\frac{1}{2}$–$2\frac{1}{2}$ in. long, similar to the leaves. Spikelets $\frac{1}{8}$ in. long, ellipsoid, dense. Glumes ovate, obtuse. Style nearly as long as the nut, glabrous, deciduous together with the pyramidal style-base; branches 3, at least in the lower flowers. Nut hardly $\frac{1}{2}$ the length of the glume, obovoid, trigonous, dark-coloured, not longitudinally ribbed. —Benth. in Hook. Niger Fl. 554; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 608, in Dyer, Fl. Cap. vii. 203; Durand & Schinz, Études Fl. Congo, i. 303; Urban, Symb. Antill. ii. 82; Rendle in Cat. Afr. Pl. Welw. ii. 123. *F. glomerata*, Boeck. in Linnæa, xxxvii. 47 partly; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 51; K. Schum. in Engl. Pfl. Ost-Afr. C. 124 (not *Scirpus glomeratus*, Retz.). *F. rigidula*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 150, not of Nees. *Scirpus obtusifolius*, Lam. Ill. i. 141; Schumach. Beskr. Guin. Pl. 30. *Isolepis obtusifolia*, Beauv. Fl. Owar. ii. 38, t. 81, fig. 1. *Trichelostylis obtusifolia*, Nees in Linnæa, ix. 290.

Upper Guinea. Senegal, *Roger! Heudelot*, 450! Senegambia, *Leprieur!* Guinea, *Thonning*, 376! Sierra Leone, *Afzelius!* Liberia: Grand Bassa, *Vogel*, 70! Niger Territory: Oware, *Beauvois!* Nun River, *Vogel*, 34! *Mann*, 532!

Lower Guinea. Lower Congo, *Smith!* Angola: Loanda; seashore of Baia da Zamba Grande, *Welwitsch*, 6993!

Mozamb. Dist. Zanzibar, *Kirk! Baron!* German East Africa: Usaramo; Dar-es-Salaam, *Kuntze*, 209! Usambara; Muoa, *Holst*, 3036! Rovuma Bay, *Kirk!* Portuguese East Africa: Zambesi Delta; Kongoni River, *Kirk!*

Also in South Africa, the Mascarene Isles and Tropical America.

21. **F. oligostachys,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 505. Glabrous or very nearly so. Stems annual, slender, tufted, 2–5 in. long. Leaves $\frac{3}{4}$ the length of the stem, slender, weak. Spikelets 1–4 on each stem, in one head or nearly so, chestnut or purple-black, $\frac{1}{6}$ in. long, 5–10-flowered; bracts 2, lower $\frac{1}{4}$–$1\frac{1}{2}$ in. long, as though a continuation of the stem. Glumes spiral or obscurely distichous, nearly glabrous, apiculate. Style longer than the nut, nearly glabrous, deciduous

together with the pyramidal style-base; branches 3. Nut $\frac{2}{3}$ the length of the glume, obovoid, trigonous, transversely wavy, yellow-brown.—*F. purpureo-atra*, Engl. Hochgebirgsfl. Trop. Afr. 149; Durand & Schinz, Conspect. Fl. Afr. v. 609. *F. exilis*, Durand & Schinz, Conspect. Fl. Afr. v. 604 partly. *Scirpus purpureo-ater*, Boeck. in Linnæa, xxxviii. 379.

Nile Land. Abyssinia: near Jomara, *Schimper*, 1268! Begemeder, *Schimper* 1251!

Also in Socotra.

This may be a depauperated state of *F. exilis*, as see I. B. Balfour in Trans. Roy. Soc. Edin. xxxi. 307. It differs mainly by the absence of the needle-like white hairs, abundant in *F. exilis*.

22. **F. monostachya,** *Hassk. Pl. Jav. Rar.* 61. Glabrous. Stems tufted, 2–16 in. long, slender. Leaves $\frac{1}{2}$ the length of the stem, $\frac{1}{16}$–$\frac{1}{10}$ in. broad. Spikelet on each stem 1 (rarely 2–3), $\frac{1}{2}$ by $\frac{1}{5}$ in. and few-flowered, or larger (in fruit up to 1 in. long) and many-flowered, greenish-white or yellowish. Glumes ovate, mucronate, much keeled, lower distichous, upper spiral. Style longer than the nut, hairy, deciduous together with the pyramidal style-base; branches 3. Nut rather large, less than $\frac{1}{2}$ the length of the glume, trigonous, pyriform-obovoid, straw-coloured or pale brown, more or less tubercled.—Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 149; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 649, in Durand & Schinz, Conspect. Fl. Afr. v. 607, and in Dyer, Fl. Cap. vii. 203; K. Schum. in Engl. Pfl. Ost-Afr. C. 124; Durand & Schinz, Études Fl. Congo, i. 302; Urban, Symb. Antill. ii. 83; Rendle in Cat. Afr. Pl. Welw. ii. 122. *Cyperus monostachyos*, Linn. Mant. 180; Rottb. Descr. et Ic. 18, t. 13, fig. 3. *Abildgaardia monostachya*, Vahl, Enum. ii. 296; Kunth, Enum. ii. 247; Benth. in Hook. Niger Fl. 554; Boeck. in Linnæa, xxxvii. 53; T. Thoms. in Speke, Nile, Append. 654; Oliver in Trans. Linn. Soc. xxix. 169, t. 109, fig. A (which does not show well the much-contracted base of the nut).

Nile Land. British East Africa: Niamniam; Nganye, *Schweinfurth*, 3962! Unyoro, *Speke & Grant!* Ruwenzori, 6000 ft., *Scott-Elliot*, 6808! Mount Kenia, *Gregory*, 87! Ukamba, 4000 ft., *Scott-Elliot*, 2355! Mombasa, *Taylor!*

Lower Guinea. Island of St. Thomas, *Don!* Angola: Huilla; between Monino and Eme, *Welwitsch*, 6839!

Mozamb. Dist. Zanzibar, *Boivin!*

In nearly all tropical and warm-temperate areas.

23. **F. tristachya,** *Thwaites, Enum. Pl. Zeyl.* 434, *not of R. Br. nor of Nees.* Stems 16–28 in. long, with 2–5 (rarely 1) distinct spikelets usually nearly 1 in. long. Nut large, finally black; otherwise as *F. monostachya.*—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 649, and in Durand & Schinz, Conspect. Fl. Afr. v. 610. *F. triflora*, K. Schum. in Engl. Pfl. Ost-Afr. C. 124. *Cyperus triflorus*, Linn. Mant. 180. *Abildgaardia tristachya*, Vahl, Enum. ii. 297; Kunth, Enum. ii. 248;

Boeck. in Linnæa, xxxvii. 54. *A. lanceolata*, Schumach. Beskr. Guin. Pl. 33.

Upper Guinea. Guinea, *Thonning*, 348!

Mozamb. Dist. Zanzibar, *Boivin! Kuntze*, 207! German East Africa: Mafia Island, *Frere!* Zanguebar, *Kirk!* Usambara; Doda, *Holst*, 2934! Rovuma Bay, *Kirk!* Rovuma River, *Kirk!* Portuguese East Africa: Zambesi Delta; Kongoni River, *Kirk!*

Also in South India and Ceylon.

F. monostachya, Hassk., is usually much slenderer (and with smaller spikelets) than the present plant; but large examples of *F. monostachya* I can only distinguish by the pale nut.

24. **F. africana,** *Durand & Schinz, Conspect. Fl. Afr.* v. 601. Thinly hairy, nearly all over. Stems 12–20 in. long. Leaves $\frac{1}{4}$–$\frac{1}{3}$ the length of the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Spikelets 3–10 on each stem, capitate, $\frac{1}{2}$ in. long, brown; bracts 2–3, short (up to $2\frac{1}{2}$ in. long occasionally), setaceous, at the base often ciliate-woolly. Glumes ovate, boat-shaped, submucronate, lower subdistichous, upper spiral. Style long, woolly, not separating from the subcuboid style-base; branches 3, linear. Nut $\frac{1}{3}$ the length of the glume, obovoid, much narrowed at the base, obtusely trigonous, transversely wavy or wrinkled, straw-coloured or brownish. —*F. pilosa*, K. Schum. in Engl. Pfl. Ost-Afr. C. 124, not of Vahl. *Schœnus pilosus*, Willd. Phyt. i. 3, t. 1, fig. 3; Vahl, Enum. ii. 208; Schumach. Beskr. Guin. Pl. 29. *Abildgaardia pilosa*, Nees in Linnæa, ix. 289; Kunth, Enum. ii. 248; Benth. in Hook. Niger Fl. 554; Boeck. in Linnæa, xxxvii. 52; T. Thoms. in Speke, Nile, Append. 654; Oliver in Trans. Linn. Soc. xxix. 169, t. 109, fig. B, and ser. 2, Bot. ii. 353.

Upper Guinea. Guinea, *Thonning! Hart!* Gold Coast: Afrem Plains, *Johnson*, 726! Accra, *Don!* Dahomey, *Newton*, 5! 31! 32! Lagos: *Lagos Government*, 37! Niger Territory: Niger River, *Vogel!* Nupe, *Barter*, 491! Onitsa, *Barter*, 1762!

Nile Land. British East Africa: Kilimanjaro Expedition, 40–60 miles from the coast, *Johnston!* Mombasa, *Boivin! Taylor!*

Mozamb. Dist. Zanzibar, *Taylor!* German East Africa: Usambara; Muoa, *Holst*, 3051! Unyamwezi; near Kaseh (Tabora), *Speke & Grant!* Gonda, *Boehm*, 170! British Central Africa: Nyasaland; Manganja Hills, *Meller! Waller! Kirchsond!* Shire Highlands, *Buchanan*, 57! *Scott-Elliot*, 8458! Mount Malosa, 4000–6000 ft., *Whyte!* Zomba Plains, 2500–3000 ft., *Whyte!*

Imperfectly known species.

25. **F. falcifolia,** *Boeck. in Linnæa*, xxxvii. 25. Pale green, glabrous. Roots fibrous, very slender. Stems several, tufted, setaceous, 6–4 in. long, obsoletely 5-angular, slightly compressed, furrowed, smooth. Leaves few, 3–2 in. long, falcate (dry and flexuose), somewhat rigid, linear, half a line wide, narrowed towards the top, acute, flattish, minutely punctate, margins slenderly serrulate; sheaths short, margined by a hyaline membrane, obliquely truncate at the mouth. Umbel "half-compound," 5–7-rayed; bracts 3–4, lower narrow-linear, scarcely

½ shorter than the umbel; rays spreading, capillary, angular, scabrous on the angles, the longer about 1 in., with 2 or 3 branches. Spikelets oblong-lanceolate, acute, "terete subangular," 18–10-flowered, 3–2½ lin. long. Glumes in several ranks, rigid, rather close together, adpressed, broad-ovate, boat-shaped, obtuse or very shortly mucronate, keel green, 1-nerved, sides smooth, rusty straw-coloured, margins white, hyaline. Nut small, by more than one-half shorter than the glume, obovate, trigonous, the angles marked by a prominent line, with a small boss, cancellate, pale straw-coloured. Style but little exserted, shortly 3-fid.

Nile Land. Galabat: region of Matamma, *Schweinfurth* (ex *Boeckeler*).

The cover of this species in the Berlin Herbarium was found empty so that the plant has probably been removed to some known species.

26. **F. oligostachya,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 125. Tufted; roots fibrous, very slender. Stems erect, 2–1 in. long, capillary, 4-angled. Leaves shorter than the stem, capillary. Spikelets 3–1, capitate, oblong-ovoid, obtuse, 12–8-flowered, 2–1⅓ lin. long. Bracts 2; the lower overtopping the spikelets. Glumes membranous, 3-ranked, at length spreading, ovate, acute, boat-shaped, hairy, pale rust-coloured, sometimes chestnut-wavy-marbled near the prominent obsoletely 3-nerved keel; margins subciliate. Nut very small, half the length of the glume, obovate, attenuate close to the base, triangular, transversely coarsely wrinkled, longitudinally striate, chestnut-coloured, shining; the tubercle minute, depressed, concolorous. Style very slender, shortly exserted, 3-fid.—*F. minima*, Hochst. ex Boeck. in Linnæa, xxxvi. 744. *Scirpus oligostachyus*, Boeck. l.c. 743.

Nile Land. Abyssinia, ex *Boeckeler & K. Schumann.*

Mozamb. Dist. Zanzibar, ex *K. Schumann.*

F. oligostachys, Hochst. (n. 21 above) was founded on Schimper n. 1268; K. Schumann says expressly that the present plant is not that, and places it in his section *Bulbostylis*, to which, from Boeckeler's description, it may belong.

27. **F. setifolia**, *A. Rich. Tent. Fl. Abyss.* ii. 507. Perennial, stoutly tufted. Stem erect, slender, 1 ft. long, striate, very scabrous. Leaves linear, convolute, setaceous, scabrid, ciliate, shorter than the stem. Spikes 5–6, subsessile, agglomerate, terminal; bracts 0. Glumes imbricate on all sides, oval, obtuse, subfimbriate on the edges, purple, on the back 1-nerved and subscabrid. Stigmas 3. Immature nut triquetrous.

Nile Land. Abyssinia: Wojerat district; in the mountains, *Petit* (ex *A. Richard*).

A. Richard adds that the species is very close to *F. oligostachys*, but is much larger than it and with more numerous leaves. I refrain from hazarding any guess from the description, which (with all its detail) contains nothing to show to what genus the plant belongs.

28. **F. thonningiana**, *Boeck. in Linnæa*, xxxviii. 395. Green, tufted. Root fibrous, slender. Stem filiform, furrowed, angular,

puberulous and scabrid, 14 in. high, with many leaves at the base. Leaves close together, rigid, falcate, spreading, linear, flat, obtuse, sheaths very short, edges subciliate at the base scabrous above, 5–4 in. by 1–1¼ line. Umbel decompound, 12-rayed; bracts 2, scarcely 1 in. long; rays spreading, very unequal, setaceous, compressed subangular, sub-puberulous scabrous, the outer 2–1 in. long, with 8 secondary rays, the inner 3–4 lin. long with 1 spikelet; secondary rays capillary, unequal, exterior with 3 spikelets, the rest with 1 spikelet; bracts to secondary umbels 2, setaceous, short. Spikelets in fruit ovate-lanceolate, acute, terete, 8–6-flowered, 2 lin. long. Glumes rigid, sub-4-ranked, spreading at the tip, round-ovate, obtuse, strongly and obtusely keeled, nerveless, longish mucronate, on the disc rust-coloured or fuscous, towards the edge paler, shining, the 2 lowest empty, smaller, round, long-mucronate. Nut small, ½ the length of the glume, round-obovate, but little narrowed at the base, at the top obtuse, bare, trigonous, densely sprinkled over by granules carrying pores, snow-white, pearly-glistening. Style short and slender, conically thickened at the base; stigmas 3 or 2, exserted. Stamens 1–3.

Upper Guinea. Guinea, *Thonning* (ex *Boeckeler*).

Boeckeler adds that he formerly referred this species to *F. scaberrima*, but that he now regards it as near *F. muricatula*. It is doubtless some remarkable plant both from the nut being thickly clothed by poriferous granules and from the style-branches being 3 or 2.

10. **BULBOSTYLIS**, Kunth, Enum. ii. 205.

Spikelet of many spirally imbricate glumes, lowest 1 or 2 empty, many or several succeeding glumes 2-sexual and perfecting nuts, uppermost male or sterile. Hypogynous bristles 0. Stamens 3–2, anterior. Style glabrous, linear, deciduous leaving its enlarged base as a dark-coloured button on the nut; branches 3 (2 in *B. striatella*), linear. Nut obovoid (sometimes narrowly so), very obtuse or truncate, pallid till quite ripe.—Stolons 0; rhizome 0 or very short. Stems slender. Leaves all near the base of the stem, very narrow (nearly always setaceous or capillary) often hairy; leaf-sheaths generally with needle-like white hairs in the throat. Inflorescence a terminal umbel, simple or compound, or reduced to a head or 1 spikelet. Flower-glumes nearly always pubescent on the back.—*Fimbristylis*, Sect. *Oncostylis*, Benth. et Hook. f. Gen. Pl. iii. 1049.

Species 74, in the tropics or warmer regions of the world, especially in Africa and America where one species extends north to Canada.

*Style 2-fid. Stem slender, with 1 spikelet . .	1. *B. striatella.*
**Style 3-fid. Stem slender, with 1 spikelet.	
Nut transversely wavy.	
Spikelet ½ in. long, with numerous nuts . .	2. *B. festucoides.*
Spikelet ¼ in. long, with nuts only in the basal half	4. *B. sphærocarpus.*
Nut smooth; spikelet ⅓ in., oblong-ellipsoid, obtuse	3. *B. zambesica.*

***Style 3-fid. Stem with 1 head of spikelets only (heads occasionally umbelled in South African examples of *B. cinnamomea*).

Stem glabrous at the top; sometimes scabrous or obscurely hairy in *B. collina* and *B. laniceps*.
Nut without longitudinal ribs or transversely wavy lines.
Spikelets usually $\frac{1}{12}$ in. broad or more, 3–20 in a head.
Spikelets acute, minutely pubescent.
Nut broadly obovoid . . . . 5. *B. barbata.*
Nut narrowly obovoid. . . . 11. *B. cardiocarpa.*
Spikelets obtuse, with some long white hairs . . . . . 8. *B. collina.*
Spikelets scarcely $\frac{1}{16}$ in. broad, numerous, very closely packed . . . . 10. *B. laniceps.*
Nut with transverse (often very minute) wavy lines; outermost cells longitudinally oblong.
Stem 2–4 in. long with 2–1 spikelets . . 6. *B. rarissima.*
Stem 18–24 in. long; spikelets $\frac{1}{3}$ in. long . 7. *B. cinnamomea.*
Stem 24–32 in. long; spikelets $\frac{3}{4}$ in. long . 16. *B. aphyllanthoides.*
Nut longitudinally striate, horizontally trabeculate; outermost cells transversely oblong . . . . . 15. *B. schimperiana.*
Stem minutely hairy at the top (see also *B. collina* and *B. laniceps* above).
Bracts hardly longer than the head, suberect; plants sparsely hairy.
Spikelets $\frac{1}{6}$ in. long, numerous . . . 9. *B. filamentosa.*
Spikelets $\frac{1}{3}$–$\frac{1}{2}$ in. long, usually 3–6 in a head.
Leaves setaceous.
Spikelets acute . . . . . 12. *B. erratica.*
Spikelets obtuse . . . . . 13. *B. atrosanguinea.*
Leaves very narrowly linear . . . 14. *B. scleropus.*
Bracts conspicuous, spreading, green; whole plant hairy . . . . . 17. *B. Buchanani.*

****Style 3-fid. Heads of spikelets umbelled (cf. also 7. *B. cinnamomea*), though stems with one head only are not rare.

Rhizome woody; nut transversely wavy, not striate lengthwise . . . . . 18. *B. Zeyheri.*
Annual, slender; nut striate lengthwise, and transversely barred . . . . . 19. *B. trabeculata.*

*****Style 3-fid. Spikelets numerous, all (or most) pedicelled, not clustered.

Spikelets more than $\frac{1}{2}$ in. long.
Spikelet 1, rarely 2; leaf-sheaths bearded in the throat . . . . . 34. *B. macra.*
Spikelets 3–5; leaf-sheaths glabrous in the throat . . . . . 35. *B. megastachys.*
Spikelets less than $\frac{1}{2}$ in. long (only a few attaining even $\frac{1}{3}$ in. long).
Nut trabeculate, slenderly and obscurely striate lengthwise . . . . . 29. *B. Johnstoni.*
Nut smooth, more or less transversely wavy, or obscurely reticulate or dotted.

Stems hairy, at least at the top close under the umbel.
Stem with longish scattered needle-like hairs often over its whole length.
Stem filiform, 1–4 in. long, with 1–2 spikelets . . . . . 26. *B. filiformis.*
Stem 4–12 in. long, with 3–6 spikelets 31. *B. andongensis.*
Stem nearly glabrous except for minute hispid hairs under the umbel.
Spikelets ellipsoid or oblong; umbel congested . . . . . 21. *B. puberula.*
Spikelets ovoid, less than twice as long as broad.
Leaves $\frac{1}{2}$ as long as the stem; umbel of many spikelets . . . 28. *B. coleotricha.*
Leaves none or very short; umbel of 1–4 spikelets . . . 32. *B. transiens.*
Stems glabrous even at the very top under the umbel.
Spikelets ellipsoid, about twice as long as broad.
Spikelets $\frac{1}{5}$–$\frac{1}{6}$ in. long.
Nut pallid, smooth or with faint transverse wavy lines.
Spikelets none clustered.
Leaves setaceous, straight . 20. *B. capillaris.*
Leaves filiform, flexuose . . 27. *B. abortiva.*
Spikelets some clustered . . 30. *B. parva.*
Nut black, strongly wavy transversely . . . . . 25. *B. pusilla.*
Spikelets $\frac{1}{3}$ in. long; nut pyriform, almost stalked . . . . . 24. *B. argenteobrunea.*
Spikelets $\frac{1}{4}$ in. long.
Rhizome hardly any; or annuals.
Spikelets numerous, pale-brown . 23. *B. Burchellii.*
Spikelets 3–6, chestnut-brown . 31. *B. andongensis,* var. β.
Rhizome horizontal, short.
Leaves $\frac{1}{3}$ the length of the stem . 36. *B. oritrephes.*
Leaves short, often hardly any . 37. *B. trichobasis.*
Spikelets ovoid, less than twice as long as broad, chestnut-red.
Spikelets several; nut pyriform . . 22. *P. Taylori.*
Spikelets 1 (or 2); nut unknown . . 33. *B. melanocephala.*
Spikelets cylindric, thrice as long as broad 33. *B. cylindrica.*

1. **B. striatella,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 616. A tufted annual. Stem 2–7 in. long, glabrous, with 1 or 2 spikelets. Leaves about as long as the stem, setaceous, minutely hairy. Bract longer or shorter than the spikelet. Spikelets $\frac{1}{3}$ by $\frac{1}{8}$ in., subsquarrose; sessile spikelets at the base of the stem are not rarely added. Glumes elliptic-acuminate, mucronate, glabrous; keel 1–3-nerved, green, sides ferruginous. Style 2-fid. Nut $\frac{1}{3}$ the length of the glume, obovoid,

flattened on the anterior face, biconvex, pale brown, minutely striate lengthwise.—C. B. Clarke in Dyer, Fl. Cap. vii. 205. *Isolepis humillima*, Hochst. ex C. B. Clarke in Durand & Schinz, Conspect, Fl. Afr. v. 616.

Nile Land. Abyssinia: Memsa (Memsach?), *Quartin-Dillon;* and without precise locality, *Schimper*, 355!

Also in South Africa.

2. **B. festucoides,** *Kunth, Enum.* ii. 207, *cf.* 205. A tufted annual. Stem 2–8 in. long, striate, glabrous or minutely hairy, with one spikelet. Leaves $\frac{1}{2}$ the length of the stem, setaceous, glabrous or minutely hairy; sheaths hairy, with long white hairs in the mouth. Spikelet $\frac{1}{2}$ by $\frac{1}{10}$ in., brown; bract suberect, shorter or longer than the spikelet. Glumes in many spirals, ovate, acuminate, submucronate, nearly glabrous; keel green, sub-3-nerved. Style rather shorter than the nut; branches 3, long. Nut $\frac{1}{3}$–$\frac{1}{2}$ the length of the glume; obovoid, trigonous, pallid, transversely wavy; style-base persistent as a button on the nut, red-brown.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 613. *Scirpus festucoides*, Poir. in Lam. Encycl. vi. 752; Boeck. in Linnæa, xxxvi. 743. *Isolepis festucoides*, Steud. Syn. Pl. Glum. ii. 100.

Upper Guinea. French Guinea: Sulimania; Erimakuna, *Scott-Elliot*, 5244!

Frequent in the Mascarene Islands.

Scott-Elliot's plant has a smaller spikelet, but larger more wavy nut than the Mascarene material.

3. **B. zambesica,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v.616. Tufts very dense, hard with wiry roots. Stem 4–6 in. long, setaceous, minutely scabrous hairy, with one spikelet. Leaves $\frac{1}{2}$ the length of the stem, capillary, scabrous hairy; sheaths with white hairs in the mouth. Spikelet $\frac{1}{3}$ by $\frac{1}{8}$ in., oblong-ellipsoid, obtuse, dusky brown. Lowest glume mucronate, but little longer than the fertile glumes; glumes ovate, at the tip triangular and subobtuse, hairy; keel green, 3-nerved. Style as long as the nut; branches 3, long. Nut less than $\frac{1}{2}$ the length of the glume, obovoid, trigonous, pallid, smooth; persistent style-base dark-red.—*Fimbristylis zambesica*, K. Schum. in Engl. Pfl. Ost-Afr. C. 125.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Sochi, 3000 ft., *Kirk!* Kampala, *Scott-Elliot*, 8464! between Blantyre and Matope, *Scott!*

4. **B. sphærocarpus,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 616. A tufted annual. Stem 2–5 in. long, glabrous, with one spikelet. Leaves $\frac{3}{4}$ the length of the stem, capillary, most minutely hairy; sheaths obscurely bearded in the mouth. Spikelet $\frac{1}{4}$ by $\frac{1}{14}$ in., bearing a few nuts at the base, lanceolate and male above; bract $\frac{1}{2}$ in. long, setaceous; basal (i.e. stemless) spikelets are often added. Fertile glumes ovate, acuminate, rust-coloured, scabrous-hairy. Style nearly as long as nut; branches 3. Nut less than $\frac{1}{2}$ the length of the glume, obovoid, trigonous, smooth, straw-coloured, transversely wavy; style-

base left on the nut, dusky-black.—*Scirpus sphærocarpus*, Boeck. in Linnæa, xxxvi. 741. *S. nindensis*, Ficalho & Hiern in Trans. Linn. Soc. ser. 2, Bot. ii. 27. *Fimbristylis sphærocarpa*, K. Schum. in Engl. Pfl. Ost-Afr. C. 125.

Nile Land. Gallabat: region of Matamma, *Schweinfurth*, 2046! 2047!

Lower Guinea. Angola: Amboella; at Ninda, *Serpa Pinto* (ex *Ficalho & Hiern*).

5. **B. barbata,** *Kunth, Enum.* ii. 208, *cf.* 205. A densely tufted annual. Stems 1–10 in. long, very slender, at the top trigonous and glabrous. Leaves $\frac{1}{2}$ the length of the stems, setaceous, nearly glabrous; sheaths more or less hairy, with long white hairs in their throats. Spikelets 3–12, sessile in one head, $\frac{1}{4}$–$\frac{1}{2}$ in. in diam., from ferruginous to dark brown, $\frac{1}{8}$–$\frac{1}{3}$ in. long, oblong-lanceolate, acute, 3–15-flowered; bracts 3, setaceous, short or much longer than the head. Glumes rather distant on the rhachilla, boat-shaped, ovate-lanceolate, with a small subrecurved mucro, more or less pubescent. Stamens 2–1; anthers oblong, muticous. Style as long as the nut; branches 3; style-base left as a red or black button on the pallid nut. Nut $\frac{1}{3}$ the length of the glume, trigonous, obovoid, almost truncate, smooth, without longitudinal ribs or transverse wavy lines.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 651, and in Durand & Schinz, Conspect. Fl. Afr. v. 611; Durand & Schinz, Études Fl. Congo, i. 304. *B. Willdenowii*, Kunth, Enum. ii. 210, cf. 205. *Scirpus barbatus*, Rottb. Descr. et Ic. 52, t. 17, fig. 4; Boeck. in Linnæa, xxxvi. 751, excl. var. *β*. *S. antarcticus*, Thunb. Fl. Cap. ed. Schult. 96 partly; Schumach. Beskr. Guin. Pl. 29; not of Linn. *Isolepis barbata*, R. Br. Prodr. 222; Benth. in Hook. Niger Fl. 553. *I. Willdenowii*, Steud. Syn. Pl. Glum. ii. 102; Benth. in Hook. Niger Fl. 553. *I. subtristachya*, Hochst. ex Schweinf. Beitr. Fl. Aethiop. 216; Boeck. in Linnæa, xxxvi. 752. *Fimbristylis barbata*, Benth. Fl. Austral. vii. 321; K. Schum. in Engl. Pfl. Ost-Afr. C. 125.

Upper Guinea. Senegambia, *Heudelot*, 441! *Leprieur!* Senegal, *Sieber*, 6! *Perrottet*, 833! Cape Verd, *St. Hilaire!* Dahomey, *Newton*, 3! 4! 25! Togo, *Baumann*, 538! Gold Coast: Accra, *Vogel!* *Brown*, 309! 429! Lagos: Sobakin, *Lagos Government*, 29! Abeokuta, *Crowther!* Niger Territory: Nupe, *Barter*, 159! 840! *Baikie!* Lower Niger; Stirling, *Vogel*, 161!

Nile Land. Abyssinia: Agow Territory, near Mawerr, 3000–4000 ft., *Schimper*, 2166! and without precise locality, *Schimper*, 1193!

Lower Guinea. Lower Congo: Lutete, 1800–2000 ft., *Hens*, 52! 61! 242! 380! Zambi, *Dupuis!* Kisantu, *Gillet*, 660! and without precise locality, *Smith!*

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1200 partly! *Boivin!*

Also in the Mascarene Islands, India, China, Japan, Malaya, and Tropical Australia.

6. **B. rarissima,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 615. Stem 2–3 in. long, setaceous, with 1 spikelet or 2 sessile together, glabrous. Leaves nearly glabrous; sheaths hardly ciliate in the throat. Spikelets $\frac{1}{8}$ by $\frac{1}{12}$ in., 8–12-flowered, pale brown. Glumes

pubescent, in fruit spreading horizontally. Style 3-fid. Nut $\frac{1}{3}$ the length of the glume, trigonous, obovoid, almost truncate, transversely wavy-lineate (owing to the outermost cells being longitudinally oblong); crowned by the persistent depressed-bulbous style-base; otherwise resembling small examples of *B. barbata*.—*Cyperus rarissimus*, Steud. Syn. Pl. Glum. ii. 16.

Nile Land. Abyssinia, *Schimper!*

7. **B. cinnamomea,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 612. Rhizome hardly any. Stems tufted, 18–24 in. long, slender, at the top trigonous and obscurely scabrous on the angles. Leaves $\frac{1}{3}$ the length of the stems, setaceous; sheaths pale ferruginous, sparingly hairy. Head 1, of 1–8 rather large spikelets (a second peduncled head very rarely present); bracts 2, lower setaceous shorter or much longer than the spikelets. Spikelets $\frac{1}{3}$ by $\frac{1}{8}$ in., narrowly ellipsoid, cinnamon-coloured or chestnut-brown, 8–20-flowered. Glumes densely placed, ovate, acute, slightly keeled, obscurely pubescent. Style 3-fid. Nut $\frac{1}{3}$ the length of the glume, trigonous, obovoid, truncate, pallid, transversely wavy lineate, crowned by the persistent depressed-bulbous red or black style-base.—C. B. Clarke in Dyer, Fl. Cap. vii. 209. *Scirpus cinnamomeus*, Boeck. in Engl. Jahrb. v. 505. *Fimbristylis cinnamomea*, K. Schum. in Engl. Pfl. Ost-Afr. C. 125.

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 29! 1452!

Also in South Africa and the Mascarene Islands.

8. **B. collina,** *Kunth, Enum.* ii. 208, *cf.* 205. Stems densely approximated on a short woody rhizome, 4–16 in. long, at the top trigonous and glabrous or obscurely hairy. Leaves $\frac{1}{3}$ the length of the stem, setaceous; sheaths with long white hairs in the throat. Head 1, $\frac{1}{3}$–$\frac{1}{2}$ in. in diam., of 12 spikelets; lowest bract usually overtopping the head. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long, ellipsoid, of 5–12 flowers. Glumes ovate, brown or chesnut-coloured, the green keel excurrent in a mucro, pubescent, some long white ciliate hairs often added on the margins. Style with 3 branches; style-base left on the nut as a small brown-red cone. Nut $\frac{2}{3}$ the length of the glume, trigonous, obovoid, pallid, smooth, without transverse wavy lines.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 613 partly, and in Dyer, Fl. Cap. vii. 208. *Isolepis collina*, Steud. Syn. Pl. Glum. ii. 101. *Scirpus collinus*, Boeck. in Linnæa, xxxvi. 746. *S. bœckelerianus*, Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 50. *S. collinus*, var. *bœckeleriana*, Schweinf. l.c. 104.

Nile Land. Eritrea: Kohaito Plateau, 8500–8800 ft., *Schweinfurth*, 105! Addi Quareh, 7500 ft., *Schweinfurth*, 106! Lulamba, near Keren, 5900 ft., *Schweinfurth*, 837!

Mozamb. Dist. German East Africa: Karagwe; on dry hills, *Scott-Elliot*, 8119!

Frequent in South Africa.

9. **B. filamentosa,** *Kunth, Enum.* ii. 21 *cf.* 205. Rhizome hardly any. Stems densely tufted, 8–20 in. long, slender, at the top trigonous, hairy. Leaves $\frac{2}{3}$ the length of the stem, setaceous; sheaths hairy, with long white hairs in the throat, often torn. Head 1, $\frac{1}{3}$–$\frac{2}{5}$ in. in diam., of 6–14 spikelets, chestnut-brown; bracts 3–2, setaceous, lowest often overtopping the head. Spikelets $\frac{1}{6}$ by $\frac{1}{12}$ in., 6–10-flowered. Glumes boat-shaped, ovate, minutely apiculate, pubescent but with no long white hair. Stamens 3; anthers linear, with a minute terminal bristle. Style 3-fid. Nut $\frac{2}{5}$ the length of the glume, acutely trigonous, obovoid, truncate, pallid, with obscure transverse lines; style-base persistent, ovoid, larger than usual, hardly darker than the nut.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 613, and in Dyer, Fl. Cap. vii. 206; Durand & Schinz, Études Fl. Congo i. 306; Durand & De Wild. in Comptes-rendus Soc. Bot. Belg. xxxvi. 89; Rendle in Cat. Afr. Pl. Welw. ii. 124. *Scirpus filamentosus,* Vahl. Enum. ii. 262; Schumach. Beskr. Guin. Pl. 30; Boeck. in Linnæa, xxxvi. 747 (excl. the American plants and synon.), and in Flora, 1879, 563. *Isolepis filamentosa,* Roem. & Schultes, Syst. Veg. ii. 113; Benth. in Hook. Niger Fl. 553. *Fimbristylis filamentosa,* K. Schum. in Engl. Pl. Ost-Afr. C. 125. *F. collina,* Ridley in Trans. Linn. Soc. ser. 2. Bot. ii. 154.

Upper Guinea. Sierra Leone? Kabusa, *Scott-Elliot,* 5467! and without precise locality, *Afzelius!* Niger Territory: Nupe, *Barter,* 1577!

Nile Land. Upper Sennar: Fazokl, *Figari!* British East Africa: Jur; Jur Ghattas, *Schweinfurth,* 1995!

Lower Guinea. Lower Congo: Lutete, 1500–2000 ft., *Hens,* A, 238! Stanley Pool, *Demeuse!* Kimuenza, *Gillet,* 1644! 1703! 1770! and without precise locality, *Smith,* 308! Angola: Pungo Andongo; higher pastures of the Præsidium, *Welwitsch,* 7151! mountainous places east of Quilombo Quiacatubia, 2200 ft., *Welwitsch,* 7004! Queta Mountains, *Welwitsch,* 7004B!

South Central. Congo Free State: Monbuttu; by the River Welle, *Schweinfurth,* 3516! Nlempu, *Butaye!*

Mozamb. Dist. British Central Africa: Nyasaland; Plains of Zomba, 2500–3000 ft., *Whyte!*

Also in the Transvaal.

Var. ? *barbata,* C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 614. Stem minutely hairy at the top. Head of about 4 spikelets, larger than those of typical *C. filamentosa,* Kunth. Glumes with some long white hairs on the margins. Nut with transverse wavy lines.—*Abildgaardia barbata,* Beauv. Fl. Owar. ii. 47, t. 86, fig. 1; Kunth, Enum. ii. 250. *Cyperus barbatus,* Poir. Encycl. Suppl. v. 186.

Upper Guinea. Sierra Leone, *Afzelius,* 583! Niger Territory: Oware, *Beauvois!*

This is very doubtfully placed with *B. filamentosa;* in everything, except the nut (which has its outermost cells longitudinally oblong), it much more resembles *B. collina.*

10. **B. laniceps,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 614. Rhizome hardly any. Stems densely tufted, 8–16 in. long,

slender, at the top glabrous or nearly so. Leaves $\frac{1}{2}$ the length of the stem, setaceous; sheaths nearly glabrous, scarcely ciliate in the throat. Head 1, $\frac{1}{4}$ in. in diam., globose, dense, of 20 spikelets, with some long white hairs arising both from the margins of the glumes and from the receptacle; bracts setaceous, hardly exceeding 1 in. in length. Spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. long, lanceolate, compressed, 6–10-flowered, chestnut-brown. Glumes ovate, acuminate, mucronate, puberulous. Style 3-fid. Nut $\frac{1}{3}$ the length of the glume, trigonous, obovoid, truncate, smooth, dusky brown; style-base persistent, small, conic.—Durand & Schinz, Études Fl. Congo, i. 306; De Wild. & Durand, Ill. Fl. Congo, i. 21, t. 11. *Fimbristylis laniceps*, K. Schum. in Engl. Pfl. Ost-Afr. C. 125 in obs.

Upper Guinea. Sierra Leone, *Afzelius!* Liberia: Grand Bassa, *Vogel*, 92!

Lower Guinea. Corisco Island, *Mann*, 1885! Lower Congo: Stanley Pool, 950 ft., *Hens*, B, 347! Kisantu, *Gillet*, 1591! 1651!

South Central. Congo Free State: Lukolela, 950 ft., *Hens*, C, 163!

11. **B. cardiocarpa,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 612. Rhizome 0. Stems 12–20 in. long, tufted, stouter than in the preceding species, at the top trigonous and glabrous. Leaves 3–9 in. long, setaceous, inrolled; sheaths woolly-ciliate, with straight white hairs in the throat. Head 1, $\frac{1}{3}$–$\frac{1}{2}$ in. in diam., chestnut-brown, of 10–20 spikelets; bracts 2, shorter than the head. Spikelets $\frac{2}{3}$ in. long, oblong-lanceolate, 5–12-flowered. Glumes densely imbricate, ovate, acuminate, mucronate, puberulous towards the top. Style 3-fid. Nut $\frac{1}{4}$ the length of the glume, trigonous, rather narrowly obovoid, pallid, truncate (almost depressed at the insertion of the button), not longitudinally ribbed nor transversely wavy-lineate; style-base persistent, small, conic, dark-red; outermost cells subquadrangular, prominent, sometimes inflated.—Rendle in Cat. Afr. Pl. Welw. ii. 124. *Fimbristylis cardiocarpa*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 154; K. Schum. in Engl. Pfl. Ost-Afr. C. 125, not of F. Mueller.

Upper Guinea. Sierra Leone, *Morson!*

Lower Guinea. Lower Congo: Stanley Pool, *Callewaert!* Kisantu, *Gillet*, 622! Kimuenza, *Gillet*, 791! Angola: Pungo Andongo; in lofty places on Pedras de Guinga, *Welwitsch*, 6816! Huilla; lofty pastures and slopes of Morro de Monino, *Welwitsch*, 6948! 6960!

Var. β *Holubii*, C. B. Clarke. Nut much larger, $\frac{1}{2}$–$\frac{3}{5}$ the length of the glume, lead-coloured when fully ripe; style-base large, short-cylindric.—*B. cardiocarpa*, C. B. Clarke in Dyer, Fl. Cap. vii. 208.

Mozamb. Dist. Rhodesia: Leshumo Valley, *Holub!*

Also in South Africa.

Some of the heads are overtopped by the lowest bract.

12. **B. erratica,** *C. B. Clarke.* Nearly glabrous, except the minutely hairy glumes and top of the stem. Rhizome woody, stout but very short. Stems approximate, 4–14 in. long, at the top trigonous

and minutely hairy or glabrate. Leaves nearly as long as the stem, setaceous, inrolled; sheaths pale brown, not bearded in the throat. Head 1, of 3–5 spikelets, bright chestnut-brown; lowest bract ovate at the base, the linear green or yellow termination longer or shorter than the head. Spikelets $\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., cylindric-lanceolate. Glumes closely imbricate, often 15–20 to the spikelet, the nutbearing glumes up to $\frac{1}{5}$ in. long, elliptic-oblong, scarcely acute; keel green or yellow. Style shorter than the nut, branches 3. Nut $\frac{1}{4}$–$\frac{1}{3}$ the length of the glume, oblong, somewhat obovoid, truncate, trigonous with 3 shining angles, and chestnut-brown in colour, marked inconspicuously by transverse wavy lines; outermost cells longitudinally oblong; style-base persistent on the nut, small, conic.—*B. schœnoides*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 616, partly; Rendle in Cat. Afr. Pl. Welw. ii. 124. *Schœnus ? erraticus*, Hook. f. in Journ. Linn. Soc. vi. 22. *Isolepis schœnoides*, Hook. f. in Journ. Linn. Soc. vii. 225. *Chætospora nigricans*, Boeck. in Linnæa, xxxviii. 290, partly, i.e. G. Mann's plant. *Fimbristylis kunthiana*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 151. *F. schœnoides*, K. Schum. in Engl. Pfl. Ost-Afr. C. 125 partly. *Scirpus kamerunensis*, K. Schum. in Preuss, Exsicc. 925.

Upper Guinea. Cameroons: Cameroon Mountain, 7000–11000 ft., *Mann*. 1344! 2105! *Johnston*, 41! and without precise locality, *Preuss*, 925! Fernando Po: Clarence Peak, 9000 ft., *Mann*, 655! 1472!

G. Mann's examples are excellent and ripe; the plant is certainly a *Bulbostylis*. The ripe nut is remarkable, and separates it from all other species of *Bulbostylis* where the nut is known, but unfortunately the nut in *B. schœnoides* is not known.

13. **B. atrosanguinea,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 611. Rhizome hardly any. Stems densely tufted, 1 foot long, slender, at the top triquetrous and minutely hairy. Leaves nearly as long as the stem, setaceous, minutely hairy; sheaths hairy, scarcely bearded in the throat. Head 1, $\frac{1}{2}$–$\frac{3}{5}$ in. in diam., of 4–12 spikelets, chestnut-coloured; lowest bract setaceous, usually much overtopping the head. Spikelets $\frac{1}{3}$ in. long, oblong or narrow-ellipsoid, 6–12-flowered. Glumes closely imbricate, ovate, obtuse or scarcely acute, keeled. Stamens 3. Style long, glabrous; branches 3, linear. Nut (seen only young) trigonous-obovoid.—*Scirpus atrosanguineus*, Boeck. in Engl. Jahrb. vii. 276; Oliver in Trans. Linn. Soc. ser. 2, Bot. ii. 353. *S. schœnoides*, Engl. Hochgebirgsfl. Trop. Afr. 148. *Fimbristylis atrosanguinea*, Volkens, Kilimand. 311; K. Schum. in Engl. Pfl. Ost-Afr. C. 125. *F. schœnoides*, K. Schum. in Engl. Pfl. Ost-Afr. C. 125 partly.

Nile Land. British East Africa: Nandi, 7000–8000 ft., *Scott-Elliot*, 6971!

Lower Guinea. Angola: Huilla; near Nene, *Welwitsch*, 6949!

Mozamb. Dist. German East Africa: Kilimanjaro, 8500–11000 ft., *Volkens*, 892! 1300! *Johnston*, 157! British Central Africa: Nyasaland; Mount Zomba, 4000–6000 ft., *Whyte!*

14. **B. scleropus,** *C. B. Clarke in Dyer, Fl. Cap.* vii. 207. Nearly glabrous, except the flower-glumes. Stems densely tufted, 10–16 in. long; basal sheaths broad, hard, chestnut-black striated. Leaves $\frac{1}{2}$–$\frac{2}{3}$ the length of the stem, narrow-linear, channelled, harsh, flexuose. Spikelets 6–10, $\frac{1}{2}$ by $\frac{1}{6}$ in., in one head, subspicate, the lowest spikelet being sometimes $\frac{1}{8}$–$\frac{1}{5}$ in. distant, chestnut-black; bracts 2, lower $\frac{1}{4}$–$\frac{3}{4}$ in., erect. Glumes elliptic-oblong, hardly acute. Nut $\frac{1}{3}$ the length of the glume, trigonous, obovoid, truncate, finally brown, minutely transversely wavy. Style longer than the nut; branches 3, linear; base persistent on the nut, small, ovoid, dark-coloured.—*B. schœnoides*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 616 partly, and in Trans. Linn. Soc. ser. 2, Bot. iv. 54.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Mlanji, 6000 ft., *Whyte*, 75!

Also in South Africa.

15. **B. schimperiana,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 616, Rhizome hardly any. Stems densely tufted, 4–9 in. long, slender, at the top glabrous and 9–13-ribbed. Leaves $\frac{1}{2}$ the length of the stem, setaceous; sheaths with long white hairs in the throat. Head 1, of 2–10 spikelets, dark red or brown, $\frac{1}{3}$–$\frac{1}{2}$ in. in diam.; bracts 2–1, setaceous, about as long as the head. Spikelets $\frac{1}{5}$ by $\frac{1}{12}$–$\frac{1}{10}$ in., ellipsoid, or subcylindric, obtuse, many-flowered. Glumes ovate, obtuse, minutely hairy, the green keel hardly excurrent. Style as long as the nut; branches 3. Nut $\frac{2}{5}$ the length of the glume, trigonous, obovoid, truncate, pallid, with about 18 longitudinal striations and transversely barred between them (i.e. the external cells of the nut transversely oblong, superimposed in vertical series); style-base persistent on the nut, conic.—*B. subumbellata*, K. Schum. in Stuhlmann, Exsicc. 3966 a. *Isolepsis schimperiana*, Hochst. in Flora 1841, i. Intell. 21; A. Rich. Tent. Fl. Abyss. ii. 501. *Fimbristylis schimperiana*, Boeck. in Flora, 1858, 600. *F. subumbellata*, K. Schum. in Engl. Pfl. Ost-Afr. C. 125. *Scirpus schimperianus*, Boeck. in Linnæa, xxxvi. 750; Engl. Hochgebirgsfl. Trop. Afr. 148. *S. fimbristyloides*, K. Schum. in Stuhlmann, Exsicc. 1505

Nile Land. Abyssinia: Begemeder? Addi Bachdanit, 6800 ft., *Schimper*, 846! Gerra, 8200 ft., *Schimper*, 1253! Tigre; near Adoa, *Schimper*, 299! British East Africa; Athi, *Gregory*, 102!

Mozamb. Dist. German East Africa: Karagwe; Bukoba, *Stuhlmann*, 1164! 1505! 3966A!

The plant Stuhlmann 1505 is regarded by K. Schumann as the same species as 3966A; but it is young, and has some long white hairs at the base of the head, and possibly may not belong.

16. **B. aphyllanthoides,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 611. Rhizome short, descending. Stems tufted, 24–32 in. long, rather robust, at the top trigonous and glabrous. Leaves 8–12 in. long, flat, up to $\frac{1}{8}$ in. broad, many-striate, at the top suddenly narrowed, glabrous; sheaths with long white hairs in the throat. Head 1, large,

of 6–7 spikelets; bracts 2–3, lower up to $1\frac{1}{2}$ in. long by $\frac{1}{12}$ in. broad in the lower part, glabrous, conspicuously scarious on the edges. Spikelets $\frac{3}{4}$ in. long and upwards, elongate-lanceolate, many-flowered. Glumes $\frac{1}{3}$ in. long, ovate, obtuse, minutely puberulous, rusty-brown. Style (the unbranched part) nearly $\frac{1}{4}$ in. long, slender, glabrous; branches 3, linear, much shorter. Nut $\frac{1}{4}$–$\frac{1}{3}$ the length of the glume, trigonous, obovoid, obtuse, pallid, obscurely transversely wavy lineate; style-base remaining behind on the nut, conic, dark-brown.—Rendle in Cat. Afr. Pl. Welw. ii. 124. *Fimbristylis aphyllanthoides*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 151.

Upper Guinea. Gold Coast: plains near Accra, *Brown*, 406!

Lower Guinea. Angola: Pungo Andongo; low hills near Condo, on the right of the River Cuanza, and at Quisonde, *Welwitsch*, 6837!

A larger plant, with much larger spikelets than any other African *Bulbostylis*.

17. **B. Buchanani,** *C. B. Clarke.* Hairy nearly all over. Rhizome 0. Stems tufted, 4–10 in. long, slender. Leaves $\frac{1}{2}$ the length of the stem, setaceous or almost capillary; sheaths with long white hairs in the throat. Head 1, $\frac{1}{5}$–$\frac{2}{5}$ in. in diam., dense, of about 10 spikelets, a dusky green; bracts 3–5, lowest up to 1–$1\frac{1}{2}$ in. long, setaceous, flexuose. Spikelets $\frac{1}{6}$ in. long, oblong, 3–5-flowered. Glumes ovate, acute. Style with 3 branches. Nut nearly $\frac{1}{2}$ the length of the glume, trigonous, obovoid, truncate, pallid, with conspicuous transverse wavy lines; style-base remaining behind on the nut, small, black-purple.

Mozamb. Dist. British Central Africa: Nyasaland, *Buchanan*, 1329!

18. **B. Zeyheri,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 616. Rhizome woody, short, rather stout. Stems tufted, 8–20 in. long, rather slender, at the top glabrous. Leaves $\frac{1}{2}$ as long as the stem, setaceous; sheaths with long white hairs in the throat. Heads 1–4, of 2–7 spikelets each, the umbel narrow and sometimes congested into 1 head; bracts short. Spikelets $\frac{1}{4}$ in. long, ellipsoid, bright brown, with little (or no) long white hair. Glumes ovate, acute, pubescent. Style 3-fid. Nut $\frac{1}{3}$–$\frac{1}{2}$ the length of the glume, trigonous, oblong-obovoid somewhat narrowed at the top, yellow-brown, transversely lineolate; style-base persistent on the nut, short-cylindric.—C. B. Clarke in Dyer, Fl. Cap. vii. 209. *Scirpus Zeyheri*, Boeck. in Linnæa, xxxvi. 752.

Nile Land. British East Africa: Ukamba, 5000–6000 ft., *Scott-Elliot*, 6424! 6426!

Frequent in South Africa.

19. **B. trabeculata,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 616. Annual. Stems 2–6 in. long, slender, at the top glabrous. Leaves 1–2 in. long, setaceous; sheaths with long white hairs in the throat. Spikes of 3–8 spikelets, simply umbelled, chestnut-coloured; bracts small. Spikelets hardly $\frac{1}{3}$ in. long, narrow-elliptic.

Glumes ovate, acuminate, with a small mucro, pubescent. Style 3-fid. Nut $\frac{1}{3}$–$\frac{2}{3}$ the length of the glume, round-trigonous, narrowly obovoid, somewhat narrowed at the top, pale brown, with about 15 slender longitudinal striations, and trabeculate horizontally between the striæ; style-base left on the nut as a small depressed button.—Rendle in Cat. Afr. Pl. Welw. ii. 126. *Fimbristylis barbata*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 152.

Lower Guinea. Angola: Loanda; on the Island of Casanga, *Welwitsch*, 6982! sandy shore of Praia de Zamba Grande and Maianga d'El Rei, *Welwitsch*, 7000! Mossamedes; Cabo Negro, on the banks of the River Caroca, *Welwitsch*, 6962!

The separate heads of spikelets (here usually umbelled) resemble greatly the head of *B. barbata* (always solitary); the marking of the nut differs.

20. **B. capillaris,** *Kunth*, var. **trifida,** *C. B. Clarke in Hook. f. Fl. Brit. Ind.* vi. 652. A densely tufted annual. Stems 2–12 in. long, setaceous, at the top glabrous. Leaves $\frac{1}{2}$ as long as the stems, setaceous; sheaths with long white hairs in the throat. Spikelets in a simple or compound lax umbel, all solitary, or in weak examples, only 3–1 to a stem; bracts setaceous, short. Spikelets usually $\frac{1}{8}$ by $\frac{1}{20}$ in., about 12-flowered, but vary from $\frac{1}{20}$ to $\frac{1}{4}$ in., from dark-brown to pale brown. Glumes boat-shaped, ovate, hardly acute, nerveless, pubescent; keel pallid. Stamens usually 2; anthers narrow-oblong, muticous. Style as long as the nut, filiform, glabrous; branches 3, long. Nut $\frac{2}{3}$ the length of the glume, trigonous, obovoid, truncate, pallid or pale brown, smooth, without vertical or transverse undulate lines, or the transverse undulations faintly indicated; outermost cells short oblong longitudinally; style-base persistent on the nut as a small depressed ovoid button.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 612; Durand & Schinz, Études Fl. Congo, i. 305; Durand & De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 89; Rendle in Cat. Afr. Pl. Welw. ii. 125. *B. trifida*, Kunth, Enum. ii. 213, cf. 205. *Scirpus capillaris*, Linn. Mant. 321; Engl. Hochgebirgsfl. Trop. Afr. 148. *Isolepis trifida*, Nees in Wight, Contrib. 108; Hook. f. in Journ. Linn. Soc. vii. 224; cf. Boeck. in Flora, 1860, 178. *Fimbristylis capillacea*, Steud. in Zoll. Verz. Ind. Archip. ii. 61; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 153. *F. capillaris*, K. Schum. in Engl. Pfl. Ost-Afr. C. 125. *Isolepis capillaris*, F. Muell. Fragm. ix. 7.

Upper Guinea. Togo, *Baumann!* Dahomey, *Newton*, 25! Niger Territory: Nupe, *Barter*, 1579! Cameroons: Cameroon Mountain, 6000–1000 ft., *Mann*, 1360! 2093! Fernando Po: Clarence Peak, 8500 ft. to the summit, *Mann*, 660! 1471! *Milne!*

Nile Land. Abyssinia: Begemeder; near Gafat, *Schimper*, 1251, bis! Arnba Sea? 6000 ft., *Schimper*, 847! Memsa (Memsach), *Quartin-Dillon!* British East Africa: Athi, *Gregory*, 23!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 352! Lower Congo: Gombi to Lutete, *Hens*, A, 298! Kisantu, *Gillet*, 417! 1564! Angola: Pungo Andongo; Pedras de Guinga, *Welwitsch*, 6819! Huilla; between Empelauca and Humpata, *Welwitsch*, 6958! around Empelaca, *Welwitsch*, 6958B!

Mozamb. Dist. German East Africa: Kilimanjaro, 5000–10,000 ft., *Volkens*, 665 ! 666 ! 832 ! 1468A ! 1910 ! Usambara; Mtai, *Holst*, 2473 ! British Central Africa: Nyasaland; near Blantyre, *Last !*

Common throughout the Old World, in tropical and warm regions. *B. capillaris*, Kunth, abounds in the New World; it has the nut definitely transverse wavy, and sometimes has radical (i.e. stemless) spikelets. So, in some Abyssinian specimens, there are added cleistogamous radical almost subterranean 1-nutted spikelets.

21. **B. puberula,** *Kunth, Enum.* ii. 213, *cf.* 205. A densely tufted annual. Stems 2–12 in. long, setaceous, at the top hairy. Leaves $\frac{1}{2}$ as long as the stem, setaceous; sheaths with long white hairs in the throat. Spikelets in a simple or compound umbel very nearly contracted into a head; the pedicels of the solitary spikelets often only $\frac{1}{20}$–$\frac{1}{10}$ in. long; bracts long or short, setaceous. Spikelets $\frac{1}{5}$ in. long, 10-flowered, oblong, dark-brown. Glumes boat-shaped, ovate, hardly acute, pubescent. Style 3-branched. Nut $\frac{1}{3}$ the length of the glume, trigonous, obovoid, truncate, pallid, transversely marked by wavy lines; style-base persistent on the nut, small, ovoid, depressed, dark red.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 652, and in Durand & Schinz, Conspect. Fl. Afr. v. 615, incl. var. β; Durand & Schinz, Études Fl. Congo, i. 307. *Scirpus puberulus*, Poir. in Lam. Encycl. vi. 767; Boeck. in Linnæa, xxxvi. 767, in small part. *S. barbatus*, Boeck. in Linnæa, xxxvi. 751 partly. *Isolepis Sieberi*, Schrad. Anal. Fl. Cap. 23 in note; Steud. Syn. Pl. Glum. ii. 104. *Cyperus pubescens*, Steud. Syn. Pl. Glum. ii. 50.

Upper Guinea. Cameroons: Cameroon Mountain; 6000–10,000 ft., *Mann*, 1360 partly ! 2093 partly !

Lower Guinea. Lower Congo, *Smith !*

Mozamb. Dist. British Central Africa: Nyasaland; Zomba Rock, *Whyte !*

Also in the Mascarene Islands, South India, Malaya.

The South American plants referred hither by Boeckeler are *B. langsdorffiana*, Kunth, which is a very closely allied species. Boeckeler's Senegal *Scirpus puberulus* is for me *Fimbristylis exilis*, Roem. & Sch. The present plant has the umbel so much contracted that it is never referred to *B. capillaris*, but (as by Boeckeler generally) to *B. barbata*. It might be treated as a variety of *B. barbata*, with a slightly loosened inflorescence, but that it further differs by the stem being hairy at the top.

22. **B. Taylori,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 616. Umbel simple, of 1–5 spikelets; rays up to $\frac{1}{3}$ in. long. Spikelets ovoid, chestnut-red. Glumes minutely hairy. Style 3-fid; style-base persistent on the nut as a discoloured button. Nut acutely triquetrous with concave faces, much contracted at the base, pear-shaped; otherwise as *B. capillaris.*—*Fimbristylis Taylori*, K. Schum. in Engl. Pfl. Ost-Afr. C. 125.

Mozamb. Dist. Zanzibar, *Taylor !*

This is separated from *B. capillaris*. It is more strongly marked than several species recorded here as being admitted by Kunth or other judicious authors. It must be understood that the genus *Bulbostylis* is very homogeneous, and that we have here a number of plants which will not match, though the points separating them are of very small botanic significance.

23. **B. Burchellii,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 612. Rhizome hardly any. Stems 4–20 in. long, very slender, glabrous at the top, firmly tufted and almost fused at the base. Leaves ½ the length of the stem, setaceous; sheaths woolly, with long white hairs at the throat. Umbel simple or compound, 2–4 in. in diam., often of 30 spikelets; many of the spikelets solitary on pedicels ¼ in. long or upwards, sometimes reduced to a head of 1–4 spikelets; bracts short, setaceous. Spikelets ¼–⅓ by $\frac{1}{12}$–$\frac{1}{10}$ in., oblong or narrow-cylindric, pale brown. Glumes ovate, hardly acute, minutely pubescent. Style 3-fid. Nut ⅓ the length of the glume, trigonous, obovoid, truncate, pale-brown, smooth with obscure transverse wavy lines; style-base persistent on the nut, small, conic, dark brown.—C. B. Clarke in Dyer, Fl. Cap. vii. 210; Rendle in Cat. Afr. Pl. Welw. ii. 125. *Fimbristylis Burchellii,* Ficalho & Hiern in Trans. Linn. Soc. ser. 2, Bot. ii. 28, t. 6, B, fig. 7–15; K. Schum. in Engl. Pfl. Ost-Afr. C. 125. *F. hispidula,* Boeck. in Linnæa, xxxvii. 27 partly. *F. huillensis,* Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 154. *Scirpus capillifolius,* Boeck. in Rehmann, Exsicc. 4330, not of Parlatore.

Lower Guinea. Angola: Huilla; pastures of Empelaca, *Welwitsch,* 6950! pastures at Catumba, *Welwitsch,* 6951!

Mozamb. Dist. Portuguese East Africa: Lower Shire, on a stony hillside at Morambala, *Scott!* British Central Africa: Boruma, on the Zambesi, *Meyharth,* 1055! Nyasaland; near Blantyre, *Last!*

Also in South Africa.

This is closely allied to *B. capillaris;* the pale brown spikelets are larger, the stems longer, and at the base stouter, the leaf-sheaths much more hairy.

24. **B. argenteobrunea,** *C. B. Clarke.* Stems densely tufted, 1 ft. long, at the top glabrous with the stomata very conspicuous as rows of dots between the ribs. Leaves half the length of the stem, setaceous; sheaths brown, with long white hairs on the throat. Umbel 1½ in. in diam., subcompound, of 6–14 spikelets; bracts as long as the umbel, setaceous. Spikelets solitary, ⅓ by ⅛ in., narrowly ellipsoid, subacute, a silver-brown colour. Glumes boat-shaped, ovate, apiculate, pubescent, a few very long white hairs added on the back; keel green. Style rather short; branches 3, long. Nut ⅖ the length of the glume, trigonous, obovoid, truncate, contracted at the base almost pear-shaped, pale brown, with transverse wavy lines; style-base persistent on the nut, small, dark-red, very short cylindric (button-shaped).

Nile Land. British East Africa: Ngomeni, in Kikumbuliu, *Scott-Elliot,* 6270!

25. **B. pusilla,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 615. Stems 1–5 in. long, with 1–9 spikelets. Nut very broadly obovoid (broader than long), trigonous, truncate, black with strong horizontal glistening-white wavy lines (i.e. the more persistent ends of the longitudinal cells which have withered off); otherwise as *R. capillaris.*—*Fimbristylis pusilla,* A. Rich. Tent. Fl. Abyss. ii. 506; Zarb, in Cat. Spéc. Bot. Pfund, 39. *Scirpus Hochstetteri,* Boeck. in Linnæa,

xxxvi. 739; Engl. Hochgebirgsfl. Trop. Afr. 148. *S. gracillimus*, Boeck. in Linnæa, xxxvi. 761, cf. xxxviii. 408. *Isolepsis gracillima*, Hochst. in Schimper, Exsicc. 2066.

Nile Land. Kordofan: El Abiad, *Pfund*, 618. Abyssinia: near Gafta, *Schimper*, 796! near Amba Sea, 6000 ft., *Schimper*, 2066! and without precise locality, *Schimper*, 458!

Mozamb. Dist. British Central Africa: Urungu; Fwambo, 5250 ft., *Nutt!*

This plant is altogether like weak examples of *B. capillaris*, var. *trifida*, except that the nut is very conspicuously transverse undulate. It is difficult to say how it differs from the American *B. capillaris*.

26. **B. filiformis,** *C. B. Clarke.* A very slender annual. Stems tufted, 1–3½ in. long, setaceous, with spreading needle-like white hairs from top to bottom. Leaves ½ the length of the stem, filiform, hairy. Spikelets 1–2 to each stem, ⅛–⅓ in. apart, $\frac{1}{12}-\frac{1}{10}$ in. in diam., ovoid-globose, chestnut-brown; bracts setaceous, hardly overtopping the inflorescence. Glumes boat-shaped, ovoid, with a short point, pubescent. Style 3-branched. Nut ½–⅔ the length of the glume, trigonous, obovoid, pale brown, transversely wavy-marked; style-base persistent on the nut, small, ovoid, dark-brown.

Nile Land. British East Africa: Kikumbuliu; Ngomeni, *Scott-Elliot*, 6231!

If hairs are to be depended on for specific distinction, the needle-like hairs on the stem of this plant, never seen on *B. capillaris*, distinguish it; but beyond these hairs there is little to distinguish it from small *B. capillaris*.

27. **B. abortiva,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 610. Rhizome 0. Stems 6–24 in. long, very slender, densely tufted at the base, glabrous at the top. Leaves half the length of the stem, capillary; sheaths with a few long white hairs in the throat. Umbel up 4–6 in. in diam., compound, with very numerous pedicelled spikelets; bracts setaceous, much shorter than the umbel, usually inconspicuous. Spikelets, glumes, style and nut, as of *B. capillaris*.—Durand & Schinz, Études Fl. Congo, i. 304; Rendle in Cat. Afr. Pl. Welw. ii. 124. *B. Camporum*, K. Schum. in Buettner, Exsicc. 123. *Fimbristylis abortiva*, Steud. Syn. Pl. Glum. ii. 111; K. Schum. in Engl. Pfl. Ost-Afr. C. 125. *F. flexuosa*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 155. *Scirpus schweinfurthianus*, Boeck. in Linnæa, xxxvi. 758, and in Flora, 1879, 563. *Isolepis schweinfurthiana*, Oliver in Trans. Linn. Soc. xxix. 167.

Upper Guinea. Togo, *Buettner*, 123! Niger Territory; Nupe, *Barter*, 413! *Baikie!* Old Calabar, *Robb!*

Nile Land. Gallabat: region of Matamma, *Schweinfurth*, 2039! Britist East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2100! 2292!

Lower Guinea. Lower Congo; Stanley Pool, 900 ft., *Hens*, B, 9! Angola: Pungo Andongo; near Banza do Soba de Umbilla, *Welwitsch*, 6828 partly! between Candumba and Mangue, *Welwitsch*, 6829!

Mozamb. Dist. German East Africa: Unyamwezi; Mininga, *Speke & Grant*, 468! Kilimanjaro, *Johnston!* Portuguese East Africa: near Morambala,

Kirk ! British Central Africa: Nyasaland; Karonga to Kondowe, 2000–6000 ft., ***Whyte !*** and without precise locality, ***Buchanan***, 66 !

Also in Madagascar.

This species differs little except in habit from *B. capillaris*, Kunth, to which, however, no author has hitherto referred it.

28. **B. coleotricha,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 613. Rhizome 0. Stems 4–16 in. long, densely tufted, very slender, at the top minutely hairy. Leaves $\frac{1}{2}$ the length of the stem, setaceous; sheaths hairy, and with long white hairs in the throat. Umbel 2 in. diam., compound or simple, with numerous solitary spikelets; but in the depauperated specimens of Schimper (the "type") the stems have only 1–3 spikelets each; bracts setaceous, often overtopping the umbels, prominent in the younger examples. Spikelets $\frac{1}{4}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., ovoid, brown. Glumes boat-shaped, ovate, obtuse, pubescent; keel green, 1–3-nerved. Style as long as the nut; branches 3. Nut $\frac{1}{2}$ the length of the glume, triquetrous, obovoid, truncate, pale brown, smooth, appearing dotted, not transversely wavy (i.e. the outermost cells subquadrangular); style-base persistent on the nut as a small dark button.—*Fimbristylis coleotricha*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 506. *Scirpus coleotrichus*, Boeck. in Linnæa, xxxvi. 763, and in Flora, 1879, 563.

Upper Guinea. Upper Senegal, *Lécard*, 109 ! Niger Territory: Nupe, *Barter*, 339 ! 357 ! 531 ! 550 ! Old Calabar, *Mann*, 2331 !

Nile Land. Gallabat: region of Matamma, *Schweinfurth*, 2029! 2038 ! Abyssinia: Gafta, *Schimper*, 1226 ! British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2083 ! 2305 !

Mozamb. Dist. British Central Africa: Lake Moero, *Changois !*

Var. β *lanifera*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 613 partly. Lowest sheaths with much ferruginous hair at the base; bracts much shorter than the umbels; spikelets with fewer more loosely packed glumes.—*Scirpus laniferus*, Boeck. in Linnæa, xxxvi. 768. *Fimbristylis lanifera*, K. Schum. in Engl. Pfl. Ost-Afr. C, 125 ?

Upper Guinea. Niger Territory: Nupe, *Barter*, 1030 ! Lagos, *Millen*, 105.

Lower Guinea. Corisco Island, *Mann*, 1887 !

Mozamb. Dist. British Central Africa: Nyasaland, ex *K. Schumann.*

29. **B. Johnstoni,** *C. B. Clarke.* Annual. Stems tufted, 4–10 in. long, setaceous, at the top glabrous. Leaves $\frac{1}{3}$–$\frac{1}{2}$ the length of the stem, almost capillary; sheaths hairy, and with long white hairs in the throat. Umbel simple, of 5–1 solitary spikelets; bracts setaceous, about as long as the umbel. Spikelets $\frac{1}{5}$ by $\frac{1}{12}$–$\frac{1}{10}$ in., oblong-ellipsoid, rusty-brown, often with a few long white hairs. Glumes boat-shaped, ovate, pubescent; keel yellowish, minutely excurrent. Nut scarcely $\frac{1}{2}$ the length of the glume, trigonous, oblong-ellipsoid, pale yellow, obscurely striated lengthwise and horizontally barred, i.e. the outermost cells transversely elliptic-oblong, arranged nearly in vertical series. Style longer than the nut; branches 3, rather short;

base persistent on the nut, ovoid, depressed, black-brown.—*B. coleotricha*, var. *lanifera*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 613 partly. *B. oritrephes*, C. B. Clarke in Trans. Linn. Soc. ser. 2, Bot. iv. 54, not C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 615.

Mozamb. Dist. German East Africa: Kilimanjaro, 5000 ft., *Volkens*, 663 ! 1466 ! *Johnston !* British Central Africa: Nyasaland; Tanganyika Plateau, 4000 ft., *Whyte !*

30. **B. parva,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 615. Annual. Stems 2–5 in. long, setaceous, at the top glabrous. Leaves $\frac{1}{2}$ the length of the stem, setaceous; sheaths with long white hairs in the throat. Umbel less than 1 in. in diam., of about 10 spikelets, some solitary, some almost clustered; bracts setaceous, shorter than the umbel. Spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. long, oblong or ellipsoid, chestnut-brown. Glumes boat-shaped, ovate, obtuse, pubescent. Nut $\frac{1}{2}$ the length of the glume, trigonous, oblong-ellipsoid, pale brown, obscurely transversely wavy. Style nearly as long as the nut; branches 3; base persistent on the nut as a small dark button.—Rendle in Cat. Afr. Pl. Welw. ii. 125. *Fimbristylis parva*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 153.

Lower Guinea. Angola: Pungo Andongo; marshy places near Luxillo, and round the Præsidium, *Welwitsch*, 6823 partly ! marshes near Quilonga, *Welwitsch*, 6831 partly !

31. **B. andongensis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 611. Annual. Stems tufted, 4–12 in. long, very slender hairy (but see var. β). Leaves $\frac{1}{2}$ as long as the stem, setaceous, with scattered hairs. Umbel simple, $1\frac{1}{4}$ in. in diam., of 3–6 solitary spikelets; bracts setaceous, much shorter than the umbel, or longer than it. Spikelets $\frac{1}{4}$ by $\frac{1}{8}$ in., ellipsoid, brown. Glumes boat-shaped, ovate, obtuse, pubescent. Nut less than $\frac{1}{2}$ the length of the glume, trigonous, obovoid, brown, smooth or obscurely transversely wavy. Style nearly as long as the nut; branches 3, linear; style-base persistent on the nut, small, ovoid-conic, dusky brown.—*Fimbristylis andongensis*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 153.

Lower Guinea. French Congo: Loango; near Chinchocho, *Soyaux*, 151 ! Lower Congo: Stanley Pool, 900 ft., *Hens*, B, 75 ! Angola: Pungo Andongo; at the foot of Pedra Songue, near the stream of Casengue, *Welwitsch*, 6823 partly ! at the stream of Caghuy, *Welwitsch*, 6824 ! Pedras de Guinga, *Welwitsch*, 6827, B, partly !

This plant resembles altogether *Fimbristylis exilis*, Roem. & Sch.; nor can I distinguish the two without looking at the nut. In *F. exilis*, the pyramidal style-base tapers into the persistent style; the nut is much larger, more pyriform, strongly horizontally waved.

Var. β *glabra*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 611. Stems glabrous at the top.—Rendle in Cat. Afr. Pl. Welw. ii. 125. *Fimbristylis andongensis*, var. *glabra*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 153. *F. quaternella*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 152.

Lower Guinea. Angola: Pungo Andongo; between Condo and Quisonde,

Welwitsch, 6820! Pedra Cambondo and Muta Lucala, *Welwitsch*, 6821! in the Præsidium, *Welwitsch*, 6825! 6830! Pedras de Guinga, *Welwitsch*, 6827B! 6830B!

32. **B. transiens,** *C. B. Clarke.* Stems 1 ft. long, slender, at the top minutely hairy. Leaves hardly any; the topmost sheath produced on one side $\frac{1}{2}$–$1\frac{1}{2}$ in., lax, pale rusty-brown, with scattered long white hairs. Spikelets 3–4, solitary, on pedicels 0–$\frac{1}{2}$ in. long, $\frac{1}{4}$ by $\frac{1}{6}$ in.; bracts shorter than the umbel. Glumes boat-shaped, ovate, hardly acute, pale brown, pubescent; keel green. Nut large, exceeding $\frac{1}{2}$ the length of the glume, trigonous, obovoid, truncate, pallid, strongly waved horizontally; style 3-branched; base persistent on the nut, large for *Bulbostylis*, ovoid-cuboid, dusky.—*Fimbristylis transiens*, K. Schum. in Holst, Exsicc. 2199.

Mozamb. Dist. German East Africa: Usambara; Bombuera, *Holst*, 2199!

33. **B. melanocephala,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 615. Stem 1–2 in. long, with 1–2 solitary ovoid-globose chestnut-red spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. long; otherwise as *B. capillaris.*—Rendle in Cat. Afr. Pl. Welw. ii. 124. *Fimbristylis melanocephala*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 151; Engl. Hochgebirgsfl. Trop. Afr. 149.

Lower Guinea. Angola: Huilla; between Morro de Lopollo and Humpata, *Welwitsch*, 6947!

I cannot find any nut on the young examples of Welwitsch on which this species is founded; and therefore do not attempt to reduce it to any known species.

34. **B. macra,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 614. Rhizome short, horizontal, woody. Stem 8 in. long, slender, glabrous at the top. Leaves $\frac{1}{2}$ the length of the stem, setaceous; sheaths with long white hairs in the throat. Spikelet 1 on each stem (a second long-pedicelled sometimes added), $\frac{1}{2}$ by $\frac{1}{10}$ in., rusty-brown; bract longer than the spikelet. Glumes boat-shaped, ovate, minutely pubescent, keel 3-nerved, tip triangular. Nut $\frac{1}{2}$ as long as the glume, large for *Bulbostylis*, trigonous, obovoid, truncate, pallid, smooth, obscurely wavy transversely. Style nearly as long as the nut; branches 3, linear; base persistent on the nut, small, ovoid, depressed, black-brown.—Rendle in Cat. Afr. Pl. Welw. ii. 124. *Fimbristylis macra*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 150.

Lower Guinea. Angola: Huilla; in thicket-grown pastures in the Lopollo district, *Welwitsch*, 6955!

35. **B. megastachys,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 614. Stems densely tufted, 12 in. long, rigid, stouter than in any other *Bulbostylis* of this section, at the top glabrous. Leaves hardly $\frac{1}{4}$ the length of the stem, setaceous, glabrous or minutely scabrous on the margins; sheaths without any white hairs in the throat. Umbel simple of 3–5 solitary spikelets; bracts 2–3, lowest $\frac{1}{4}$–$\frac{1}{3}$

in. long, rusty brown not green, narrow-lanceolate. Spikelets $\frac{1}{2}$ by $\frac{1}{8}$ in. and upwards, subcylindric, rusty brown. Glumes boat-shaped, ovate, hardly acute, minutely pubescent; keel paler, hardly excurrent. Nut $\frac{1}{3}$ the length of the glume, trigonous, obovoid, truncate, pallid, smooth, obscurely waved transversely. Style longer than the nut; branches 3, long; base persistent on the nut, small, conic, black-brown.—Rendle in Cat. Afr. Pl. Welw. ii. 125.

Lower Guinea. Angola: Huilla; on low hills at the edges of woods near Catumba, *Welwitsch*, 6952!

36. **B. oritrephes,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 615. Rhizome short, horizontal, woody. Stems densely tufted, 16 in. long, slender, at the top glabrous. Leaves $\frac{1}{3}$ the length of the stem, setaceous; sheaths hairy, with long white hairs in the throat. Umbel simple, with 2–4 long-pedicelled spikelets; bracts setaceous, less than $\frac{1}{2}$ in. long. Spikelets $\frac{1}{4}$ by $\frac{1}{10}$ in., ellipsoid, chestnut-brown. Glumes boat-shaped, ovate, obtuse, pubescent. Nut less than $\frac{1}{2}$ the length of the glume, trigonous, obovoid, truncate, pale brown, smooth. Style as long as the nut; branches 3, linear; base persistent on the nut, small, ovoid, depressed, black-brown.—Rendle in Cat. Afr. Pl. Welw. ii. 125. *Fimbristylis oritrephes*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 155. *F. orytrephes*, K. Schum. in Engl. Pfl. Ost-Afr. C. 125.

Lower Guinea. Angola: Golungo Alto; in mountainous places east of Banza de Quilombo, Sobato Quilombo, 2200 ft., *Welwitsch*, 7016! slopes of the Queta Mountains, *Welwitsch*, 7020!

37. **B. trichobasis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 616. Rhizome short, horizontal, hardly any except the thickened bases of the stems almost confluent in a row (or 2 rows). Stems 8–12 in. long, setaceous, at the top glabrous. Leaves occasionally up to 1–2 in. long, setaceous, usually very short or hardly any but the pale brown lateral continuation of the sheath, much long white hair about the sheaths. Umbel about 1 in. in diam., with 3–10 spikelets, some of which are solitary and very short pedicelled; bracts setaceous, much shorter than the umbel. Spikelets $\frac{1}{4}$ by $\frac{1}{8}$ in., oblong or ellipsoid, 6–10-flowered, dark chestnut-coloured. Glumes boat-shaped, ovate, pubescent, tip triangular, keel paler. Nut less than $\frac{1}{2}$ the length of the glume, trigonous, obovoid, pale brown, wavy transversely. Style nearly as long as the nut; branches 3, long; base persistent on the nut, small, ovoid depressed, black-brown.—*B. oritrephes*, C. B. Clarke in Trans. Linn. Soc. ser. 2, Bot. iv. 54 partly. *Scirpus trichobasis*, Baker in Journ. Linn. Soc. xx. 298. *Fimbristylis cinerea*, Ridley in Journ. Linn. Soc. xx. 335.

Nile Land. British East Africa: Ankole; east side of Lake Albert Edward, *Scott-Elliot*, 8047! 8077!

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 333!

Mozamb. Dist. British Central Africa: Nyasaland; Kondowe to Karonga,

2000–6000 ft., *Whyte !* Mount Malosa, 4000–6000 ft., *Whyte !* Mount Zomba, 4000–6000 ft., *Whyte !* Mount Mlanji, *Whyte !*

Plentiful in Madagascar, and also received from the Transvaal.

38. **B. cylindrica,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 613. A slender annual. Stems tufted, 4–6 in. long, setaceous, at the top glabrous, with 1 sessile and two long-pedicelled spikelets. Leaves hardly 1 in. long, setaceous; sheaths nearly glabrous, but with a few long very slender white hairs in the throat. Bracts to the umbel hardly $\frac{1}{8}$ in. long. Spikelets $\frac{1}{3}$ by $\frac{1}{12}$ in., narrow-cylindric, rusty-brown. Glumes obscurely keeled, ovate-oblong, obtuse, pubescent on the back, long ciliate on the margin; keel 3-nerved, not excurrent. Nut less than $\frac{1}{2}$ the length of the glume, trigonous, broadly obovoid, truncate, yellow-brown, smooth, obscurely reticulated. Style as long as the nut; branches 3, long; base persistent on the nut, small, button-like, brown.

Lower Guinea. Angola: Huilla; Humpata, *Newton*, 28!

Imperfectly known species.

39. **Scirpus (Oncostylis) buettnerianus,** *Boeck. Cyp. Novæ,* i. 20. Pale green, tufted; roots fibrous, capillary. Stems 4–6 in. long, setaceous, gently curved, obsoletely 4-angled, smooth, at the base many-leaved. Leaves much shorter than the stem, setaceous, channelled, acute, near the top spinulose; sheaths pale brown, bearded in the throat. Head $\frac{1}{8}$–$\frac{1}{6}$ in. in diam., subhemispheric, of 4–8 spikelets; bracts 3, setaceous, dilated towards the base, rusty-brown ciliate, the lowest twice longer than the head. Spikelets $\frac{1}{12}$ in. long, ovoid, terete, 7-flowered. Glumes spirally imbricate, keeled, ovate, obtuse, glabrous on the back, chestnut-coloured, not ciliate on the margin. Nut less than $\frac{1}{2}$ the length of the glume, minute, round obovoid, truncate, 3-angled with convex faces, pale brown, pearly white with many small dots; style-base very minute, depressed, brown.—Boeck. in Verhandl. Bot. Ver. Brandenb. xxxi. 71.

Lower Guinea. Lower Congo: Underhill (Tundua), *Büttner,* 4, 5 (ex *Boeckeler*).

11. **SCIRPUS,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 1049 (incl. *HEMICARPHA*, Nees; Benth. et Hook. f. l.c. 1053).

Spikelets of many perfect flowers, with imperfect ones at the top; 0–2 lowest glumes empty. Fertile glumes in 3 or more spirals. Hypogynous bristles usually retrorse-scabrid or 0, plumose in *S. littoralis*; perhaps represented by hyaline scales occasionally present in *S. Isolepis* and *S. micranthus.* Stamens 3–1, anterior; anthers muticous or scarcely crested. Ovary sessile (if stalked cf. *Ficinia*); style long linear or hardly any; branches 3 or 2, long or short; style-base not enlarged, not distinct by a constriction or difference in structure, but

passing insensibly into the top of the ovary. Nut obovoid or oblong, trigonous or biconvex, without a beak; style deciduous, or if persistent the base undistinguishable from the top of the nut.—Glabrous, except that the glumes are minutely hairy or ciliate in a few species. Stems without nodes or leaves between the basal leaves and the inflorescence. Spikelets in a head (or 1 only), or in a corymb depressed into an apparent umbel.

Species 136, spread throughout the world. The section *Sylvaticæ*, with nodes and leaves between the stem-base and inflorescence, is conspicuously absent from Africa.

*Nemum.—Glumes persistent after the nut has fallen. Style linear with 2 linear branches. Hypogynous bristles 0. Stem with 1–3 separate spikelets of a rich red-brown.

Spikelet 1; glumes glabrous . . . . 1. *S. spadiceus.*
Spikelets 3–1; glumes ciliate on the upper margin 2. *S. angolensis.*

**Isolepis.—Glumes deciduous. Style linear. Hypogynous bristles 0. Stem with 1 head of sessile spikes (except in *S. cubensis*), or branched with solitary spikes. See several species of subgenus *Euscirpus* in which the hypogynous bristles are 0. Also genus 12, *Ficinia*. . . . .

Stem with nodes, leaves and branches weak . 3. *S. fluitans.*
Stems with no nodes or leaves between the base and the inflorescence.
Stem bearing 1 spikelet; style 2-fid.
Leaves $\frac{1}{2}$–$\frac{2}{3}$ the length of the stem . . 4 *S. nervosus.*
Leaves 0 . . . . . 5. *S. verrucosulus.*
Stem bearing 3–1 spikelets or 1 head of spikelets; style 3-fid.
Stem slender, bearing 3–1 spikelets, and leaves.
Nut smooth or dotted, without ribs . . 6. *S. cernuus.*
Nut ribbed and transversely barred .. . 7. *S. setaceus.*
Stem stouter, leafless, with 1 head of many spikelets.
Nut ribbed and transversely barred . . 8. *S. costatus.*
Nut smooth without ribs; dicœcious . 9. *S. diœcus.*
Heads of spikelets umbelled; style 2-fid . . 10. *S. cubensis.*

***Euscirpus.—Stems stouter than in subgenus *Isolepis* (excepting *S. cubensis*), without nodes above the base. Style linear. Hypogynous bristles present in the majority of the species.

Inflorescence in 1 head (except in *S. supinus*, var. β). Leaves 0, or in *S. supinus* short.
Hypogynous bristles 0. Stem terete or nearly so.
Nut strongly transversely wrinkled. Green leaves short . . . . . 11. *S. supinus.*
Nut obscurely wrinkled or smooth. Leaves 0.
Glumes in fruit incurved . . . 12. *S. articulatus.*
Glumes in fruit spreading . . . 13. *S. quinquefarius.*
Hypogynous bristles 5–6. Leaves 0. Stem triquetrous . . . . . 14. *S. mucronatus.*
Inflorescence corymbose subumbellate; sometimes in *S. maritimus* reduced to 1 head.
Hypogynous bristles 0; leaves 0 .. . . 16. *S. corymbosus.*
Hypogynous bristles minutely retrorse-scabrid.

Stem terete, leaves usually 0 . . . 15. *S. lacustris.*
Stem trigonous; very leafy species.
Umbel of 3–40 dark or dusky spikelets . 17. *S. maritimus.*
Umbel of 200 pale bright brown spikelets 18. *S. læteflorens.*
Hypogynous bristles plumose; leaves hardly any . . . . . 19. *S. littoralis.*

****MICHELIANI.—Small, leafy plants. Stem without nodes between the base and small head. Spikelets small, numerous, densely and minutely stellate. Hypogynous bristles 0. Style linear; branches long. (In characters, this group differs little from subgenus *Isolepis;* but, from their habit, they are mixed with *Kyllinga*, *Mariscus*, and *Lipocarpha*, by Cyperologists as well as by collectors).

Spikelets minute, fused into 1 head; points of glumes straight . . . . . 20. *S. kyllingioides.*
Spikelets rather larger, capitate; points of glumes subrecurved . . . . . 21. *S. Steudneri.*

*****MICROSTYLI.—Small or slender annuals. Stem without nodes between the base and the small head of few spikelets. Hypogynous bristles 0. Style hardly any, caducous; stigmas very small, recurved.

Style 3-fid. Spikelets squarrose, from the recurved points of the glumes.
Nut linear-oblong . . . . . 22. *S. Lugardi.*
Nut obovoid.
Awns about as long as the glumes; nut obscure reticulate . . . . 23. *S. squarrosus.*
Awns longer than the glumes; nut prominently reticulate . . . . . 24. *S. Hystrix.*
Style 2-fid. Spikelets terete, not or obscurely squarrose.
Spikelet 1 to the stem; glumes not acuminate . . . . . 25. *S. Isolepis.*
Spikelets 3–1 to the stem; glumes shortly acuminate . . . . . 26. *S. micranthus.*

1. **S. spadiceus,** *Boeck. in Linnæa*, xxxvi. 493, *not of Linn.* Glabrous. Roots fibrous, or rhizome hardly any. Stems tufted, 8–12 in. long, slender, bearing 1 spikelet. Leaves few, $\frac{1}{2}$ as long as the stem, setaceous. Spikelet $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{5}$–$\frac{1}{4}$ in. cylindric, dense, obtuse at the top and bottom, a full rich dark red-brown; bract 1, setaceous, $\frac{1}{8}$–$\frac{1}{2}$ in. long. Glumes round-ovate, concave, scarious, rich-brown, hardly keeled or striate, very persistent after the nut has fallen. Hypogynous bristles 0. Style 2-fid. Nut scarcely $\frac{1}{3}$ the length of the glume, obovoid, compressed, smooth, chestnut-black.—Benth. et Hook. f. Gen. Pl. iii. 1050; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 630; Urban, Symb. Antill. ii. 90. *Eriocaulon spadiceum*, Lam. Ill. i. 214. *Nemum spadiceum*, Desveaux ex W. Hamilt. Prod. Ind. Occ. 13; Kunth, Enum. ii. 220.

Upper Guinea. Sierra Leone: Regent, *Scott-Elliot*, 4034! and without precise locality, *Afzelius! Smeathmann* (ex *Lamarck*), *Morson!*

Also in Hayti.

2. **S. angolensis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 617. Glabrous, except the glumes. Stem 8–12 in. long, slender, with 1 sessile and often 2 peduncled spikelets. Leaves $\frac{1}{2}$ the length of the stem, setaceous. Spikelets $\frac{1}{4}$ in. long, ovoid, bright

chestnut-red; peduncles $\frac{1}{4}$–$\frac{1}{3}$ in. long; bracts setaceous, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Glumes obovate-elliptic, obtuse, with a few cilia on the upper margins, very persistent after the nut has fallen. Hypogynous bristles 0. Style-branches 2, long. Nut scarcely $\frac{1}{3}$ the length of the glume, orbicular, compressed, smooth, chestnut-black.—Rendle in Cat. Afr. Pl. Welw. ii. 126. *S. spadiceus*, var. *ciliatus*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 156.

Lower Guinea. Angola: Pungo Andongo; marshy places on the heights of Pedra Songue, *Welwitsch*, 6836! in the Præsidium, near Catete, *Welwitsch*, 7166!

3. **S. fluitans,** *Linn. Sp. Pl. ed.* 2, 71. Glabrous. Root fibrous. Stem often floating in water, elongate, branching, leafy, weak, 2–15 in. long. Leaves $\frac{1}{4}$–$2\frac{1}{2}$ in. long, very narrow or almost capillary. Peduncles axillary, $\frac{1}{2}$–3 in. long, each carrying one quasi-terminal spikelet. Spikelet $\frac{1}{8}$–$\frac{1}{4}$ in. long, ovoid-lanceolate, dull greenish or purplish, usually 4–10-flowered. Glumes ovate, obtuse, the lowest often containing a nut, deciduous. Hypogynous bristles 0. Style linear; branches 2, linear. Nut $\frac{1}{2}$ as long as the glume, obovoid, compressed, pallid, smooth.—Sowerby, Engl. Bot. t. 216; Boeck. in Linnæa, xxxvi. 485; Ridley in Trans. Linn. Soc. ser. 2, Bot., ii. 156; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 653, in Durand & Schinz, Conspect. Fl. Afr. v. 621, and in Dyer, Fl. Cap. vii. 213; Engl. Hochgebirgsfl. Trop. Afr. 147; K. Schum. in Engl. Pfl. Ost-Afr. C. 125; Volk. Kilimand. 319; Rendle in Cat. Afr. Pl. Welw. ii. 126. *S. ramosus*, Boeck. in Linnæa, xxxviii. 377. *Isolepis fluitans*, R. Br. Prod. 221; Kunth, Enum. ii. 188; A. Rich. Tent. Fl. Abyss. ii. 498. *Eleocharis fluitans*, Hook. Brit. Fl. 24.

Nile Land. Abyssinia: Tigre; in stagnant water in the valley of the River Mareb, *Quartin-Dillon & Petit!* Begemeder; near Debra Tabor, *Schimper*, 1216! Jan Meda, 9000 ft., *Schimper*, 1103! 1254! 1294! and without precise locality, *Schimper*, 208! 803!

Lower Guinea. Angola: Huilla; in the River Quipumpunhime, *Welwitsch*, 6965! in streams on the Humpata Plain, *Welwitsch*, 6966! stream-swamps near Mumpulla, *Welwitsch*, 6967!

Mozamb. Dist. German East Africa: Kilimanjaro, 8800 ft.; Marangu, *Volkens*, 1310! and Schira, *Volkens*, 1950!

In cool places throughout the Old World, from Europe and the Cape to New Guinea; in the Tropics on mountains.

4. **S. nervosus,** *Boeck. in Linnæa*, xxxvi. 484. Glabrous. Rhizome up to 1 in. long, thread-like. Stem 2–5 in. long, slender, with 1 quasi-terminal head, no node between the head and the base. Leaves $\frac{2}{3}$ the length of the stem, setaceous. Spikelet $\frac{1}{6}$ in. long, ovoid-lanceolate, 4–10-flowered, lowest glume not bract-like. Glumes ovate, obtuse, blackish with green back. Hypogynous bristles 0. Style linear; branches 2, linear. Nut $\frac{1}{2}$ the length of the glume, narrowly obovoid, plano-convex. —Engl. Hochgebirgsfl. Trop. Afr. 147; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 628. *Isolepis nervosa*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 499. *I. fuscescens*, Steud. Syn. Pl. Glum. ii. 92.

Nile Land. Abyssinia: Samen; Enjedcap, *Schimper*, 551!

5. **S. verrucosulus,** *Steud. in Flora*, 1829, 145. Glabrous, annual. Stems tufted, 2–4 in. long, each carrying 1 nearly terminal spikelet. Leaves 0, or the sheath ending in a green point scarcely $\frac{1}{6}$ in. long. Spikelet $\frac{1}{10}$–$\frac{1}{5}$ in. long, ovoid; lowest glume sometimes bract-like and nearly as long as the spikelet, sometimes containing a nut and deciduous. Glumes ovate, obtuse, yellowish or purplish with green back. Hypogynous bristles 0. Style linear; branches 2, linear. Nut $\frac{1}{2}$ as long as the glume, obovoid-truncate, plano-convex, smooth, dark-chestnut-coloured.—C. B. Clarke in Dyer, Fl. Cap. vii. 216. *S. verruculosus*, Nees in Linnæa, vii. 496 in citation; Durand & Schinz, Conspect. Fl. Afr. v. 634. *Isolepis ptycholeptos*, Steud. Syn. Pl. Glum. ii. 93.

Upper Guinea. Senegambia, *Leprieur!*

Frequent in South Africa.

6. **S. cernuus,** *Vahl, Enum.* ii. 245. Glabrous, annual. Stems tufted, 1–5 in. long, setaceous, with 1 head of 3–1 spikelets. Leaves usually much shorter than the stem, setaceous. Spikelets $\frac{1}{8}$–$\frac{1}{4}$ in. long, ovoid, few- or many-flowered. Glumes ovate, hardly acute. Hypogynous bristles 0. Style linear; branches 3, linear. Nut $\frac{1}{2}$ as long as the glume, obovoid, trigonous, brown or black, smooth or appearing dotted, neither longitudinally ribbed nor transversely barred.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 619, and in Dyer, Fl. Cap. vii. 219. *S. Savii*, Sebast. & Mauri, Prod. Fl. Rom. 22; Sowerby, Engl. Bot. Suppl. t. 2782; Coss. & Durieu, Expl. Sc. Algér. Glum. 234. *S. setaceus*, Linn. Mant. 321; Boeck. in Linnæa, xxxvi. 501 partly; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 49? not of Linn. Sp. Pl. *Isolepis riparia*, R. Br. Prod. 222. *I. numidiana*, Roem. & Schultes, Syst. Veg. ii. 110. *I. saviana*, Schultes in Roem. & Schultes, Syst. Veg. ii. Mant. 63; Kunth, Enum. ii. 193.

Upper Guinea. Cape Verd Isles; *Wichura*, 425!

Common in most warm and temperate regions.

This species is plentiful in Algeria and in extratropical South Africa; it is also communicated from St. Helena and the Mascarene Isles, but has not been received from Tropical Africa. As to the doubtful citation of Schweinfurth, the only example of his *S. setaceus* seen looks like *S. cernuus*, but it has no ripe nuts.

7. **S. setaceus,** *Linn. Sp. Pl. ed. 2. 73 partly.* Nut longitudinally ribbed, and with transverse bars between the ribs, the outermost transverse cells being arranged in exactly vertical series; otherwise as *S. cernuus*.—Sowerby, Engl. Bot. t. 1693; Boeck. in Linnæa, xxxvi. 500 partly; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 654, in Durand & Schinz, Conspect. Fl. Afr. v. 630, in Bull. Herb. Boiss. iv. Append. iii. 33, and in Dyer, Fl. Cap. vii. 217; K. Schum. in Engl. Pfl. Ost-Afr. C. 125; Volk. Kilimand. 319. *Isolepis setacea*, R. Br. Prod. 222; Kunth, Enum. ii. 193.

Nile Land. Abyssinia; 10,000 ft., *Schimper*, 325! 384! British East Africa: Ruwenzori; in the bed of Butagu River, 7000–8000 ft., *Scott-Elliot*, 7916!

Mozamb. Dist. German East Africa: Kilimanjaro; Johann Ravine, 11,100 ft., *Volkens*, 1214! Kifinika Volcano, 9000 ft., *Volkens*, 1214!

Frequent from Europe and Africa to Australia.

8. **S. costatus,** *Boeck. in Linnæa*, xxxvi. 511. Glabrous. Rhizome 0, or hardly any. Stems tufted, 8–20 in. long, terete, not setaceous. Leaves 0, or represented by a tooth scarcely $\frac{1}{12}$ in. long. Head of 4–16 spikelets; bracts very short, but the head is frequently subproliferous. Spikelets $\frac{1}{4}$ in. long, ovoid or oblong-ellipsoid, of 5–15 flowers, chestnut- or dark-coloured. Glumes ovate, obtuse. Hypogynous bristles 0. Style linear, branches 3. Nut as of *S. setaceus*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 620, in Trans. Linn. Soc. ser. 2, Bot. iv. 54, and in Dyer, Fl. Cap. vii. 218; Engl. Hochgebirgsfl. Trop. Afr. 147; K. Schum. in Engl. Pfl. Ost-Afr. C. 126. *Isolepis costata*, A. Rich. Tent. Fl. Abyss. ii. 499. *I. setacea*, var. *abyssinica*, Boeck. in Flora, 1858, 419.

Nile Land. Abyssinia: Samen; on Mount Bachit above Demerki, 11,800 ft., *Schimper*, 103! Begemeder; in a swamp at Guna, 11,400 ft., *Schimper*, 1464! Shoa; Ankober, *Roth!* and without precise locality, *Schimper*, 1058! 1153! British East Africa: Mount Kenia, *Gregory*, 85!

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 8800 ft., *Volkens*, 1128! British Central Africa: Nyasaland; Mount Mlanji, *Whyte!*

Also in South Africa, Madagascar, and Tasmania.

9. **S. diœcus**, *Boeck. in Linnæa*, xxxvi. 719. Glabrous, diœcious. Rhizome horizontal, woody. Stem 20–30 in. long, terete, hard. Leaves 0. Head 1, apparently lateral, $\frac{2}{3}$ in. in diam., globose, often with 40–50 spikelets; lowest bract, as though continuing the stem, 1 in. long, rigid, pointed. Spikelets $\frac{1}{3}$–$\frac{1}{2}$ in. long, cylindric, pallid, many-flowered. Glumes ovate or elliptic, closely packed, margins scarious. Hypogynous bristles 0. Style linear; branches 3. Nut small, less than $\frac{1}{2}$ the length of the glume, obovoid, trigonous, smooth, brown, not ribbed longitudinally.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 621, in Bull. Herb. Boiss. iv. Append. iii. 32, incl. var. *macrocephala*, and in Dyer, Fl. Cap. vii. 226. *S. Schinzii*, Boeck. ex Schinz in Verh. Bot. Ver. Brandenb. xxix. 47, xxx. 139 in note. *Isolepis diœca*, Kunth, Enum. ii. 199.

Lower Guinea. Hereroland, *Fleck*, 125A! Damaraland, *Een!*

Frequent in South Africa.

10. **S. cubensis,** *Poeppig & Kunth ex Kunth, Enum.* ii. 172. Glabrous, except the glumes. Stolons often present; or stem at the base decumbent and rooting. Stem 1–2 ft. long, stout, trigonous at the top, without nodes from the base to the umbel. Leaves often as long as the stem, $\frac{1}{5}$ in. broad, nearly smooth or edges rough. Umbel simple; heads 4–12 (sometimes 3–1) stellate-globose, $\frac{1}{2}$ in. in diam., brown, of numerous spikelets on peduncles $\frac{1}{2}$–$2\frac{1}{2}$ in. long; bracts often 5–10, lower up to a foot long, similar to the leaves. Spikelets $\frac{1}{6}$–$\frac{1}{3}$ in. long, many-flowered. Glumes ovate, acute, rigid, their points spreading on all sides; margins ciliate. Hypogynous bristles 0. Style linear, passing gradually into the top of the ovary; branches 2, linear. Nut nearly $\frac{2}{3}$ the length of the glume, plano-

convex, narrowly obovoid, smooth; in the lower portion thickened by corky cells; the apex hardened into a conic beak not separated by a constriction from the nut.—Benth. in Benth. et Hook. f. Gen. Pl. iii. 1051; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 157; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 620, and in Bull. Herb. Boiss. iv. Append. iii. 32; K. Schum. in Engl. Pfl. Ost-Afr. C. 126. Urban, Symb. Antill. ii. 92; Rendle in Cat. Afr. Pl. Welw. ii. 127. *Cyperus blepharoleptos*, Steud. Syn. Pl. Glum. ii. 28. *Courtoisia olivacea*, Boeck. in Flora, 1861, 331. *Anosporum cubense*, Boeck. in Linnæa, xxxvi. 413, and in Flora, 1879, 561, 1881, 77. *A. Schinzii*, Boeck. in Verhandl. Bot. Ver. Brandenb. xxix. 46. *Isolepis echinocephala*, Oliver in Trans. Linn. Soc. xxix. 167 t. 107. *Crepidocarpus cubensis*, Klotzsch ex Boeckeler in Linnæa, xxxvi. 414.

Upper Guinea. Senegal, *Leprieur! Perrottet!* Niger Territory: Nupe, *Barter*, 1068!

Nile Land. Banks of the Nile at Khartoom, *Speke & Grant!* White Nile, *Brownell! Schweinfurth*, 1109! Gazelle River, *Schweinfurth*, 1150! Banks of the Nile in Unyoro, *Speke & Grant!*

Lower Guinea. Angola: Pungo Andongo; in marshes near Umbilla, on the River Cuanza, *Welwitsch*, 6848! Barra do Dande; bank of the River Dande, near Bombo, *Welwitsch*, 6994! German South-west Africa: Amboland, *Schinz*, 378!

Also common in America, from Mexico to Paraguay.

11. **S. supinus,** *Linn. Sp. Pl. ed.* 2, 73. A glabrous annual. Stems tufted, 2–12 in. long, terete, with no node between the base and the single head (but see var. β). Leaves very short, usually less than 1 in. long. Spikelets 1–7 in the head, $\frac{1}{5}$–$\frac{1}{2}$ in. long, ellipsoid or oblong, dusky greenish, obscurely angular by reason of the strongly keeled glumes; lowest bract as though a continuation of the stem, 1–6 in. long. Glumes ovate, acute, entire at the tip. Hypogynous bristles 0. Style linear; branches 3, rarely 2. Nut obovoid-truncate, triquetrous, black, with strong transverse wavy lines.—Boeck. in Linnæa, xxxvi. 699 excl. var. β, γ; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 655, in Durand & Schinz, Conspect. Fl. Afr. v. 632 and in Bull. Herb. Boiss. iv. Append. iii. 33; K. Schum. in Engl. Pfl. Ost-Afr. C. 126. *Isolepis supina*, R. Br. Prod. 221; Kunth, Enum. ii. 196; Benth. in Hook. Niger Fl. 553; A. Rich. Tent. Fl. Abyss. ii. 500. *I. polycolea*, Steud. Syn. Pl. Glum. ii. 95. *I proxima* and *I. simillima*, Steud. Syn. Pl. Glum. ii. 95. *I. pentasticha*, Boeck. in Flora, 1859, 446, and in Peters, Reise Mossamb. Bot. 544. *Scirpus polycoleus*, Notaris, Ind. Sem. Hort. Genuen. 1847.

Upper Guinea. Senegal, *Delievre!*

Nile Land. Darfur, *Purdy*, 44! Abyssinia, *Quartin-Dillon & Petit!*

Lower Guinea. Angola: Cunene River, *Johnston!* banks of the River Caculo, *Newton!*

Mozamb. Dist. Zanzibar, *Peters!*

Including varieties, this species extends from Europe to the Cape and Australia; being abundant in the Mediterranean region and in South-east Asia. The var. *Hallii* is frequent in North America.

Var. β *uninodis*, C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 656. Inflorescence of 1–4 heads in a contracted umbel, the rays sometimes nearly 1 in. long.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 632; Engl. Hochgebirgsfl. Trop. Afr. 147. *S. lateralis*, Forsk. Fl. Ægypt.-Arab. 15; Kunth, Enum. ii. 176. *S. mucronatus*, Roxb. Fl. Ind. i. 219 partly; K. Schum. in Engl. Pfl. Ost-Afr. C. 126 partly. *Isolepis uninodis*, Delile, Fl. Egypte, 8, t. 6, fig. 1.

Upper Guinea. Senegambia, *Leprieur!*

Nile Land. Abyssinia: Begemeder; near Amogai, 7200 ft., *Schimper* 253!

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1061! German East Africa: Kilimanjaro, 3300 ft., *Volkens*, 1624!

This variety extends to the Mascarene Islands, India, the Malay archipelago, and Australia.

12. **S. articulatus,** *Linn. Sp. Pl. ed.* 2, 70. A glabrous annual. Stems tufted, 2–12 in. long, terete, when dry showing transverse false septa $\frac{1}{4}$–2 in. apart, varying in thickness from $\frac{1}{10}$ to nearly $\frac{1}{3}$ in. in diam., bearing 1 dense apparently lateral globose head; lowest bract terete, appearing as a continuation of the stem, usually longer than it, sometimes 2 ft. long. Leaves 0. Spikelets $\frac{1}{4}$ to $\frac{3}{4}$ in. long, cylindric, acute or obtuse, green or variegated with purple and brown. Glumes ovate, incurved even in fruit; tip entire, triangular or rounded. Hypogynous bristles 0. Style linear; branches 3. Nut nearly $\frac{1}{2}$ the length of the glume, obovoid almost pyriform, triquetrous, brown, pyramidal at the apex, transversely undulate or smooth.—Boeck. in Linnæa, xxxvi. 702, and in Flora, 1879, 563; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 157; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 656, in Durand & Schinz, Conspect. Fl. Afr. v. 618, in Bull. Herb. Boiss. iv. Append. iii. 32, and in Dyer, Fl. Cap. vii. 228; Engl. Hochgebirgsfl. Trop. Afr. 148; K. Schum. in Engl. Pfl. Ost-Afr. C. 126; Rendle in Cat. Afr. Pl. Welw. ii. 126. *S. fistulosus*, Forsk. Fl. Ægypt.-Arab. 14. *Isolepis articulata*, Nees in Wight, Contrib. 108; Kunth, Enum. ii. 198; Boeck. in Flora, 1860, 33. *I. prælongata*, Kunth, Enum. ii. 199; Benth. in Hook. Niger Fl. 553; A. Rich. Tent. Fl. Abyss. ii. 500. *I. senegalensis*, Hochst. ex Steud. Syn. Pl. Glum. ii. 96; Schweinf. Beitr. Fl. Aethiop. 216; cf. Boeck. in Flora, 1860, 180.

Upper Guinea. Senegal, *Perrottet*, 116! 823! Upper Senegal, *Lécard*, 165! Senegambia; Galam, *Heudelot*, 319! Richard Toll, *Dollinger*, 13!

Nile Land. Kordofan, *Kotschy*, 56! 377! Abyssinia: near Gafta, *Schimper*, 1194! Begemeder; near Senka Berr, 8500 ft., *Schimper*, 1113! British East Africa: Jur; Jur Ghattas, *Schweinfurth*, ser. iii. 195! Kurshook Alis Seriba, *Schweinfurth*, 1714! Bongo; Gir, *Schweinfurth*, 2194! Matwoli, *Schweinfurth*, 4001! near Mombasa, *Taylor!*

Lower Guinea. Angola: Congo; edges of Lagoa de Quizemba, *Welwitsch*, 6978! Icolo e Bengo; margin of Lagoa de Funda, *Welwitsch*, 6851! 6979! Pungo Andongo; around ponds on Pedras de Guinga, *Welwitsch*, 6850!

Mozamb. Dist. Zanzibar, *Blackburn, Hildebrandt*, 1062! Zanquebar, *Kirk*, 9! Portuguese East Africa: Lower Zambesi; N'Kweza, *Kirk!* British Central Africa: Nyasaland, *Buchanan*, 555!

Scattered throughout Africa, also in the Mascarene Islands and India.

The African material divides easily into two groups:

(*a*) Stems slender $\frac{1}{12}$ in. thick. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long, very obtuse, greenish-yellow. Glumes very obtuse, concave, somewhat inflated, scarious. Nut small, pallid, with wavy horizontal lines.—This is called *Isolepis senegalensis* by Hochstetter, *I. prælongata* by Nees.

(*b*) Stems $\frac{1}{4}$–$\frac{1}{3}$ in. thick. Spikelets $\frac{1}{2}$ in. long and upwards, acute, marked red and brown. Glumes at the tip triangular, subacute. Nut large, dark-brown, without wavy horizontal lines.

These two forms appear separate in Africa; but the great quantity of Indian material has not been divided satisfactorily between the two. All modern authorities, from Boeckeler to Schumann, unite the two African forms as one species.

13. **S. quinquefarius,** *Boeck. in Linnæa,* xxxvi.701. Spikelets in fruit $\frac{1}{3}$ by $\frac{1}{5}$–$\frac{1}{4}$ in., the glumes laxly spreading; otherwise as *S. articulatus,* Linn., form *a*.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 657, in Durand & Schinz, Conspect. Fl. Afr. v. 629, and in Dyer, Fl. Cap. vii. 228. *Isolepis lupulina,* Nees in Wight, Contrib. 107; Kunth, Enum. ii. 197.

Nile Land. British East Africa: Athi, *Gregory,* 102!

Frequent in India, also once collected in the Transvaal.

The stems are with or without false transverse septa.

This species might be reduced to *S. articulatus;* owing to the yellow-brown much-inflated spreading glumes, the specific name "*lupulina*" (like hop-heads) was applied by Nees.

14. **S. mucronatus,** *Linn. Sp. Pl. ed.* 2, 73 *mainly.* Glabrous. Roots fibrous, or rarely a horizontal rhizome 4–6 in. long. Stems tufted, $\frac{1}{2}$–$2\frac{1}{2}$ ft. long, stout, triquetrous, bearing 1 apparently lateral head; lowest bract trigonous, appearing as a continuation of the stem, $\frac{1}{2}$–$3\frac{1}{2}$ in. long. Leaves 0. Spikelets few or numerous, $\frac{1}{5}$–$\frac{1}{2}$ in. long, ellipsoid, subacute. Glumes ovate, subacute, nearly entire at the tip. Hypogynous bristles usually 5 (or 6), unequal, some nearly as long as the nut, brown, retrorse-scabrid (but the bristles are sometimes small and occasionally 0). Style linear; branches 3. Nut less than $\frac{1}{2}$ the length of the glume, obovoid, trigonous, shining black-chestnut, smooth or obscurely transversely wavy.—Delile, Fl. Égypt, 14, t. 7, fig. 3; Kunth, Enum. ii. 161; Boeck. in Linnæa, xxxvi, 703; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 657, in Durand & Schinz, Conspect. Fl. Afr. v. 628; K. Schum. in Engl. Pfl. Ost-Afr. C. 126 partly.

Upper Guinea. Cameroons: Yaunde, *Zenker,* 677!

Also in Europe, Western Asia to Japan, Australia, and Polynesia.—This species, abundant in Europe and India, appears to avoid Africa, as it is not recorded even in Algeria by Cosson and Durieu, nor have I ever seen any example from Africa except Zenker's. It is, however, a weed that might appear anywhere in a rice-field, and may have been carried to the Cameroons.

15. **S. lacustris,** *Linn. Sp. Pl. ed.* 2, 72. Glabrous, except the glumes. Rhizome horizontal. Stem 2–6 ft. long, stout, terete or somewhat trigonous at the top. Leaves usually 0; occasionally 6–12 in. long. Umbel simple or compound, rarely contracted into a head of

clustered or solitary spikelets; lowest bract as though a continuation of the stem, 1–3 in. long. Spikelets $\frac{1}{3}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., brown. Glumes ovate, concave; tip scarious, notched, minutely hairy, with often a small point in the notch. Hypogynous bristles 6–5, as long as the nut, retrorsely scabrous (but often reduced or irregular). Style linear, branches 3 or 2. Nut more than $\frac{1}{2}$ the length of the glume, obovoid, unequally trigonous, smooth, finally brown.—Sowerby, Engl. Bot. t. 666; Kunth, Enum. ii. 164; Boeck. in Linnæa, xxxvi. 712; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 658, in Durand & Schinz, Conspect. Fl. Afr. v. 624, and in Dyer, Fl. Cap. vii. 231; Urban, Symb. Antill. ii. 93.

Upper Guinea. Sierre Leone, *Afzelius*, 498.

Abundant in Europe, common throughout Asia (except the North), and scattered nearly over the globe, except South America. Only known in Africa by the above plant of Afzelius, and a few specimens from South Africa.

16. **S. corymbosus,** *Roth, Nov. Pl. Sp.* 28. Glabrous. Rhizome 2–4 in. long, horizontal. Stems 3 ft. long, stout, terete. Leaves 0. Umbel apparently lateral, simple or compound, 3–6 in. in diam.; lower bract as though a continuation of the stem, 1–4 in. long. Spikelets clustered, $\frac{1}{4}$–$\frac{1}{3}$ in. long, ellipsoid, dusky brown. Glumes ovate, glabrous; tip subentire, mucronate. Hypogynous bristles 0. Style linear; branches 3. Nut $\frac{2}{5}$ the length of the glume, trigonous, obovoid, black, smooth, slightly transversely wavy.—Boeck. in Linnæa, xxxvi. 706; Aschers. & Schweinf. Ill. Fl. Égypte, 157; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 158; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 657, in Durand & Schinz, Conspect. Fl. Afr. v. 620, and in Dyer, Fl. Cap. vii. 229; Engl. Hochgebirgsfl. Trop. Afr. 148; Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 49, 104; K. Schum. in Engl. Pfl. Ost-Afr. C. 126; Rendle in Cat. Afr. Pl. Welw. ii. 126. *S. brachyceras*, Hochst. in Flora, 1841, i. Intell. 21; A. Rich. Tent. Fl. Abyss. ii. 496. *Isolepis corymbosa*, Roem. & Schultes, Syst. Veg. ii. 110 and Mant. 65; Kunth, Enum. ii. 216. *I. inclinata*, Delile, Fl. Ægypt. Ill. 50; Barbey, Levant, t. 8, fig. 9.

Nile Land. Abyssinia: near Adowa, *Schimper*, 288! and without precise locality, *Schimper*, 84! 253! 687! British East Africa: Tana River, *Gregory*, 78! along the River Kedong, 6000 ft., *Scott-Elliot*, 6511.

Lower Guinea. Angola: Golungo Alto; near Sange, *Welwitsch*, 7015B! Cazengo; streams near Palmira, *Welwitsch*, 7015! Ambaca; banks of the River Lucala, *Welwitsch*, 6846! Pungo Andongo; marshes between Condo and Quisonde, *Welwitsch*, 6849! Huilla; Lake Ivantala, *Welwitsch*, 6976! by the River Catumba, *Welwitsch*, 6977!

Mozamb. Dist. Zanzibar, *Taylor!* German East Africa: Usambara, *Holst*, 2552! British Central Africa: Nyasaland; Namasi, *Cameron*, 12! Shire Highlands, *Scott-Elliot*, 8581! Mount Zomba, 4000–6000 ft., *Whyte*! Ngamiland; Lake River, *Lugard*, 11!

Also in Egypt, South Africa, Madagascar, and India.

17. **S. maritimus,** *Linn. Sp. Pl. ed.* 2, 74. Glabrous. Stolons hardening into rhizomes. Stems 1–3 ft. long, stout, trigonous.

Leaves several, often as long as the stem, $\frac{1}{4}$–$\frac{1}{3}$ in. broad. Umbel compound or simple or reduced to a head of 3–1 spikelets; rarely exceeding 4–6 in. in diam.; bracts several, similar to the leaves, the lowest often 4–8 in. long. Spikelets 3–40 to the umbel, $\frac{1}{2}$–1 by $\frac{1}{5}$ in., dark brown, often clustered. Glumes ovate, at the tip emarginate and hairy, keel excurrent in a mucro. Hypogynous bristles 6–3, usually shorter than the nut, stiff, retrorsely scabrid, sometimes hardly any. Style long; branches 3 or 2, long. Nut varying much in size, unequally trigonous or flattened, obovoid, black, smooth or minutely reticulate.—Sowerby, Engl. Bot. t. 542; Kunth, Enum. ii. 167; Benth. in Hook. Niger Fl. 553; Boeck. in Linnæa, xxxvi. 722; Coss. et Durieu, Expl. Sc. Algér. Glum. 237; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 158, incl. vars.; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 658, in Durand & Schinz, Conspect. Fl. Afr. v. 626, in Bull. Herb. Boiss. iv. Append. iii. 32, and in Dyer, Fl. Cap. vii. 232; K. Schum. in Engl. Pfl. Ost-Afr. C. 126; Rendle in Cat. Afr. Pl. Welw. ii. 127, incl. var. *nobilis*. *S. corymbosus*, Forsk. Fl. Ægypt.-Arab. 14, not of Roth. *S. squarrosulus*, Steud. Syn. Pl. Glum. ii. 88. *Isolepis grandispica*, Steud. Syn. Pl. Glum. ii. 318.

Upper Guinea. Senegal, *Roger! Perrottet*, 318! Senegambia, *Leprieur!*

Nile Land. Somaliland, *Keller*, 92 bis! 93! 94! 98!

Lower Guinea. Angola: Congo; near Quizembo, *Welwitsch*, 6992! 7003! Icolo e Bengo; near Funda, *Welwitsch*, 6980! 7011! Mossamedes; in cotton-fields, *Welwitsch*, 6972! near Giraul, *Welwitsch*, 6974! banks of the River Maiombo, *Welwitsch*, 6975!

Mozamb. Dist. German East Africa: Usambara; ex *K. Schumann!* Portuguese East Africa: Mozambique, *Forbes!* Chiloane, *Scott!* British Central Africa: Nyasaland; Shire Valley, near Mankokone, *Kirk! Meller!* Boruma, on the Zambesi, *Menyharth*, 534!

Including the forms esteemed varieties by Boeckeler and Bentham, this species is abundant over all warm temperate and cool regions.

18. **S. læteflorens,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 625. Stem very stout, at the top triquetrous, scabrid on the angles. Leaves very scabrid on the margins. Umbel 3–4 times divided, 10 in. in diam., with 200 spikelets. Spikelets a pale bright cinnamon-brown, the glumes glistening all over with golden hairs: otherwise as very large *S. maritimus*.—C. B. Clarke in Bull. Herb. Boiss. iv. Append. iii. 32.

Lower Guinea. South-west Africa, *Chapman & Baines!* Hererolaud, *Fleck*, 112A!

19. **S. littoralis**, *Schrad. Fl. Germ.* i. 142, *t.* 5, *fig.* 7. Glabrous, except the glumes. Rhizome short, or sometimes elongate, slender for the plant. Stems $1\frac{1}{2}$–3 ft. long, approximate, at the base $\frac{1}{6}$–$\frac{1}{2}$ in. in diam., terete, at the top triquetrous, trigonous or nearly round. Leaves usually $\frac{1}{2}$–2 in. long, membranous, sometimes green, up to 4 in. long. Umbel compound, with numerous, mostly pedicelled, spikelets; lowest bract $\frac{1}{2}$–3 in. long, as though a continuation of the stem. Spikelets $\frac{1}{2}$–$\frac{2}{3}$ by $\frac{1}{5}$ in., subcylindric. Glumes ovate, obtuse, emarginate, rusty-

brown; keel green, excurrent into a short mucro. Hypogynous bristles 7–2, plumose with moniliform several-celled hairs. Style linear; branches 2. Nut $\frac{1}{2}$ the length of the glume, obovoid, plano-convex, black-chestnut, smooth or minutely reticulate.—Kunth, Enum. ii. 166; Coss. & Durieu, Expl. Sc. Algér. Glum. 235; Boiss. Fl. Orient. v. 383; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 659, in Durand & Schinz, Conspect, Fl. Afr. v. 625 incl. var. β, and in Dyer, Fl. Cap. vii. 231; K. Schum. in Engl. Pfl. Ost-Afr. C. 126; Rendle in Cat. Afr. Pl. Welw. ii. 127. *S. subulatus*, Vahl, Enum. ii. 268; Kunth, Enum. ii. 165; Boeck. in Linnæa, xxxvi. 715; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 158. *S. fimbrisetus*, Delile, Fl. Égypte, 11, t. 7, fig. 1. *S. ægyptiacus*, Decaisne in Ann. Sc. Nat. sér. 2, iv. 196. *S. triqueter*, Gren. & Godr. Fl. Franç. iii. 373; Boeck. in Linnæa, xxxvi. 716, not of Linn. *S. pterolepis*, Kunth, Enum. ii. 166. *Malacochæte littoralis*, Nees in Linnæa, ix. 292. *M. pterolepis*, Nees in Linnæa, ix. 292, x. 184.

Upper Guinea. Senegambia, *Heudelot*, 533!

Lower Guinea. Angola: Mossamedes; ponds near Aguadas, *Welwitsch*, 6973! Pungo Andongo; marshy places by the River Cuanza, *Welwitsch*, 6847!

Mozamb. Dist. Portuguese East Africa: Zambesi Delta; banks of the River Luabo, *Kirk!* British Central Africa: Nyasaland; shore of Lake Nyasa, *Meller!* Lake Pamolombe, *Kirk!* Boruma, on the Zambesi, *Menyharth*, 1064!

Abundant throughout the Mediterranean Region, common in South Africa, South-east Asia, Malaya and North Australia. Not in America, where it is replaced by the very closely allied *S. riparius*, Presl.

20. **S. kyllingioides,** *Boeck. in Linnæa*, xxxvi. 733. Glabrous, perennial; slender stolons sometimes present. Stems 1–6 (rarely 16) in. long, slender. Leaves $\frac{1}{2}$ as long as the stem, $\frac{1}{20}$ in. broad, grass-like. Head 1, subglobose, $\frac{1}{8}$–$\frac{1}{6}$ (rarely $\frac{1}{4}$) in. in diam., quasi-terminal, green or pale brown, the innumerable glume-points sticking out straight on all sides; bracts 3–4, spreading or pendent, leaf-like, longer than the head, sometimes 2–3 in. long. Glumes ovate, contracted rather suddenly into a linear obtuse termination. Hypogynous bristles 0. Style linear, shorter than the nut; branches 3 (or fide Boeckeler 2) long. Nut $\frac{1}{3}$ the length of the glume, oblong-obovoid, unequally trigonous, smooth, black-brown.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 662, and in Durand & Schinz, Conspect. Fl. Afr. v. 624; K. Schum. in Engl. Pfl. Ost-Afr. C. 126. *Kyllinga microcephala*, Steud. in Flora, 1842, 597, and Syn. Pl. Glum. ii. 70 excl. the Obs. *Isolepis kyllingioides*, A. Rich. Tent. Fl. Abyss. ii. 502; Schweinf. Pl. Nilot. 42.

Upper Guinea. Upper Senegal, *Lécard*, 80! 110 bis! Soudan, *Lécard*, 41! 106!

Nile Land. Sennar, *Hartmann!* Gallabat: banks of the River Gendua, *Schweinfurth*, 2053! Abyssinia: near Gon Ambra, *Schimper*, 650! Shireh Province, *Quartin-Dillon & Petit*, 650! and without precise locality, *Schimper*, 122! 848! British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 1916!

Mozamb. Dist. Zanzibar, *Taylor!* British Central Africa: Nyasaland; Zomba Plains, 2500–3000 ft., *Whyte!* Namasi, *Cameron*, 91!

Also scattered throughout Western India.

21. **S. Steudneri,** *Boeck. in Linnæa*, xxxvi. 733. Stems much thickened at the base, woody, covered by torn leaf-sheaths. Spikelets distinct, sessile, in a head more than $\frac{1}{4}$ in. broad, squarrose from the subrecurved points of the glumes; otherwise as *S. kyllingioides*.—Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 50; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 631. *Isolepis polyphylla*, A. Rich. Tent. Fl. Abyss. ii. 503. *Kyllinga ambigua*, Steud. Syn. Pl. Glum. ii. 70.

Nile Land. Eritrea: Ginda, 2900 ft., *Schweinfurth*, 149! Abyssinia: Begemeder, *Schimper*, 849! and without precise locality, *Hildebrandt*, 357! 359!

Mozamb. Dist. Zanzibar, *Taylor!*

22. **S. Lugardi,** C. B. Clarke. Annual, glabrous. Stems tufted, 2 in. long, rather stout. Leaves as long as the stem, $\frac{1}{12}$ in. broad. Inflorescence a dense compound head $\frac{1}{2}$ in. in diam., or more rarely an umbel. The 1 or 2 rays up to $\frac{1}{4}$–$\frac{1}{3}$ in. long; bracts 2 in. long, spreading, similar to the leaves. Spikes $\frac{1}{4}$ to $\frac{1}{3}$ in. long, very dense, compound, purple and green, 1–4 in the head. Spikelets less than $\frac{1}{8}$ in. long, 5–8-flowered. Glumes elliptic, 5–7-nerved, the green keel excurrent into a recurved mucro less than $\frac{1}{2}$ the length of the glume. Setæ 0. Stamens 1 (or 2) with a very small square anther. Nut narrow-oblong, trigonous, smooth, brown. Style linear $\frac{2}{5}$ the length of the nut, branches 3.

Mozamb. Dist. British Central Africa: Ngami-land; Okavango Valley, 3000 ft., growing in sand, *Lugard*, 290!

This greatly resembles *Scirpus Hystrix*, Thunb.; but the point of the glume is much shorter and the nut altogether unlike.

23. **S. squarrosus,** *Linn. Mant.* 181. A small glabrous tufted annual. Stems 2–8 in. (rarely 16 in.) long. Leaves $\frac{1}{3}$ the length of the stem, $\frac{1}{20}$–$\frac{1}{8}$ in. broad. Head of 1–6 (rarely 10) squarrose spikelets; bracts 3–5, leaf-like, spreading or pendent, 1–2 (sometimes 4) in. long. Spikelets $\frac{1}{8}$–$\frac{1}{4}$ in. long, with very many flowers, greenish or brownish. Glumes narrowly obovate, suddenly narrowed into a linear subobtuse mucro not longer than the glume, very caducous in fruit beginning from the lowest nut-bearing glume. Hypogynous bristles 0. Stamen 1 or rarely 2; anther very small, oblong. Style scarcely any; branches 3, short, much recurved. Nut $\frac{2}{3}$ the length of the glume (exclusive of the mucro), obovoid-ellipsoid, trigonous, yellow-brown or ultimately black, smooth, the outermost cells minute quadrangular, so that the nut only appears reticulated under a strong magnification.—Boeck. in Linnæa, xxxvi. 734, and in Flora, 1879, 563; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 663, and in Durand & Schinz, Conspect. Fl. Afr. v. 631. *Isolepis squarrosa*, Roem. & Schultes, Syst. Veg. ii. 111 and Mant. 65; Kunth, Enum. ii. 202. *Ascolepis tenuior*, Steud. Syn. Pl. Glum. ii. 105; cf. Boeck. in Flora, 1859, 100.

Upper Guinea. Niger Territory: Nupe, *Barter*, 761 partly!

Nile Land. Gallabat: region of Matamma, *Schweinfurth*, 3003! British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2572!

Mozamb. Dist. British Central Africa: Nyasaland; Kondowe to Karonga, 2000–6000 ft., *Whyte !*

Also in Madagascar, India, and the Philippines.

This species both by authors and by collectors (in Barter, 761) is mixed with *Lipocarpha microcephala*, R. Br.

24. **S. Hystrix,** *Thunb. Prodr.* 17. Mucro longer than the glume. Nut obviously reticulated, the outermost cells being much larger than in *S. squarrosus;* otherwise as *S. squarrosus.*—Boeck. in Linnæa, xxxvi. 735; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 623, and in Dyer, Fl. Cap. vii. 233; Rendle in Cat. Afr. Pl. Welw. ii. 127. *S. Rehmanni*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 159. *Isolepis Hystrix*, Schrad. Anal. Fl. Cap. 23; Kunth, Enum. ii. 204.

Lower Guinea. Angola: Huilla; in damp fields around Lopollo, *Welwitsch*, 6771! Huilla to Humpata, *Johnston !* banks of the River Palanca, *Newton !*

Mozamb. Dist. British Central Africa: Nyasaland; Tanganyika Plateau, at Fort Hill, *Whyte !*

Frequent in South Africa.

25. **S. Isolepis,** *Boeck. in Linnæa*, xxxvi. 498. A glabrous tufted annual. Stems 1–10 in. long, setaceous. Leaves $\frac{1}{4}$–$1\frac{1}{2}$ in. long, setaceous. Spikelet 1 to a stem, $\frac{1}{8}$–$\frac{1}{6}$ in. long, ovoid-ellipsoid, obtuse, dense, not squarrose, chestnut-coloured, sticking out at right angles apparently from the stem which is continued by the bract $\frac{1}{4}$–1 in. long. Glumes obovate with a triangular top, caducous in fruit from the lowest nut-bearing glume upwards; a small oblong, very thin hyaline lateral scale is sometimes present within the glume. Hypogynous bristles 0; unless represented by the hyaline scale. Stamen 1, occasionally 2; anther small, oblong. Style hardly any; branches 2, short, recurved. Nut $\frac{3}{4}$ the length of the glume, biconvex, obovoid or ellipsoid, smooth, black, minutely reticulated.—C. B. Clarke in Hook. f. Fl. Brit. Ind. v. 663, in Durand & Schinz, Conspect. Fl. Afr. v. 624, in Bull. Herb. Boiss. iv. Append. iii. 32, and in Dyer, Fl. Cap. vii. 233; Rendle in Cat. Afr. Pl. Welw. ii. 128. *Hemicarpha Isolepis*, Nees in Edinb. New Phil. Journ. xvii. 263; Kunth, Enum. ii. 268; Benth. et Hook. f. Gen. Pl. iii. 1053; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 161. *H. Schraderi*, Kunth, Enum. ii. 268; A. Rich. Tent. Fl. Abyss. ii. 507. *H. senegalensis*, Steud. Syn. Pl. Glum. ii. 130. *Lipocarpha Rautanenii*, Boeck. in Verhandl. Bot. Ver. Brandenb. xxxi. 179.

Upper Guinea. Senegal, *Perrottet, Leprieur*, 9!

Nile Land. Gallabat: region of Matamma, *Schweinfurth*, 2047.

Lower Guinea. Angola: Pungo Andongo; Sansamanda, *Welwitsch*, 6814! in marshy places at Lombe, *Welwitsch*, 6815! between Condo and Quisonde, *Welwitsch*, 6818! Huilla; in the lofty meadows of Empalanca, *Welwitsch*, 6963! German South-west Africa: Amboland, *Rautanen*, 219!

Also in South Africa and India.

26. **S. micranthus,** *Vahl, Enum.* ii. 254. Spikelets 3–1 to each stem, in an apparently lateral cluster, somewhat squarrose. Glumes

ovate, shortly acuminate; otherwise as *S. Isolepis.*—Boeck. in Linnæa, xxxvi. 499; Ridley in Journ. Linn. Soc. xxvii. 67; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 627, and in Bull. Herb. Boiss. iv. Append. iii. 33; Urban, Symb. Antill. ii. 94; Rendle in Cat. Afr. Pl. Welw. ii. 128. *Isolepis micrantha*, Roem. & Schultes, Syst. Veg. ii. 110; Kunth, Enum. ii. 203. *Hemicarpha subsquarrosa*, Nees in Mart. Fl. Bras. ii. i. 61, t. 4, fig. 1; Benth. et Hook. f. Gen. Pl. iii. 1053; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 162. *Hypolytrum capillare*, Schrader ex Nees in Mart. Fl. Bras. ii. i. 61.

Lower Guinea. Angola: Loando; margins of ponds near Conceiçao, *Welwitsch*, 6981! 6996! Damaraland: Upingtonia, *Schinz!*

Throughout America, very common.

This, like the preceding species, has sometimes 1 (rarely 2) hyaline scale inside the glume.

Imperfectly known species.

27. **Schœnoplectus senegalensis,** *Palla in Engl. Jahrb.* x. 299.

Central Africa; ex *Palla.*

There is no description. The plant if not a *Scirpus*, is probably one of the *Scirpeæ.*

12. **FICINIA,** Schrad.; Benth. et Hook. f. Gen. Pl. iii. 1052.

Gynophore minute, obpyramidal, often trigonous or toothed on the upper margin, carrying the ovary or nut, inserted within the stamens; otherwise as *Scirpus*, Sect. *Isolepis.*

Species 58; whereof 55, i.e. all except the 3 below enumerated, are confined to Extratropical South Africa.

The genus, in habit as in character, is as *Scirpus*, Sect. *Isolepis.* The subjoined species are glabrous, the stem without nodes between the basal leaves and the head of spikelets, the hypogynous bristles absolutely 0.

Stems tufted, elongate, slender; glumes scarcely $\frac{1}{10}$ in. long.
- Heads of 3–1 spikelets; stems setaceous . . 1. *F. filiformis.*
- Heads of 6–20 spikelets; stems slender . . 2. *F. gracilis.*

Stems solitary, $\frac{1}{2}$–1 in. long; glumes $\frac{1}{5}$ in. long . . 3. *F. clandestina.*

1. **F. filiformis,** *Schrad. Anal. Fl. Cap.* 46. Glabrous. Stems 2–8 in. long, setaceous, densely tufted on a wooded base; no stolons seen, but most of the wiry-rooted species throw stolons sometimes. Leaves $\frac{1}{2}$ the length of the stem, setaceous; sheaths pale brown with scarious edges that early wither up, the uppermost leafless. Head of 3–1 spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. long; bracts 2–3, lowest $\frac{1}{4}$–$\frac{1}{2}$ in. long, setaceous, suberect. Glumes ovate, obtuse, strongly marked by chestnut-red striations. Style linear; branches 3. Nut less than $\frac{1}{2}$ the length of the glume, ovoid, trigonous, smooth, black, top pyramidal; gynophore about $\frac{1}{3}$ the length of the nut, pallid, narrowly obpyramidal, the upper margin with 3 depressed rounded

lobes.—Kunth, Enum. ii. 253 partly; Boeck. in Linnæa, xxxvii. 59; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 638, and in Dyer, Fl. Cap. vii. 242. *Scirpus leucocoleus*, K. Schum. in Engl. Pfl. Ost-Afr. v. 125.

Mozamb. Dist. German East Africa: Kilimanjaro; Volcano of Kifinika, 9800 ft., *Volkens*, 1858!

Also in South Africa.

Volkens' collections have ripe nuts, and the plant is certainly a *Ficinia*, and either *F. filiformis*, Schrader, or a subspecies thereof.

2. **F. gracilis,** *Schrad. Anal. Fl. Cap.* 44. Glabrous. Stems 6–16 in. long, rather slender, tufted on a woody rhizome; stolons sometimes present. Leaves $\frac{1}{2}$ the length of the stem, scarcely $\frac{1}{16}$ in. broad, channelled; sheaths with scarious edges that wither up, the uppermost often with a long leaf. Head $\frac{2}{3}$ in. in diam., of 6–20 spikelets; bracts 3, lowest leaf-like, spreading, 1–1$\frac{1}{2}$ in. long. Spikelets $\frac{1}{4}$ in. long; green variegated with chestnut or ultimately brown. Glumes ovate, obtuse or with a short point, chestnut-red, striate. Style linear; branches 3. Nut less than $\frac{1}{2}$ the length of the glume, obovoid, trigonous, smooth or obscurely transversely-lineolate, dull black; gynophore small, obpyramidal, upper margin shallowly 3-lobed.—Kunth, Enum. ii. 256; Boeck. in Linnæa, xxxvii. 68; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 638, and in Dyer, Fl. Cap. vii. 251; Volk. Kilimand. 311

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 8800 ft., *Volkens*, 1300!

Also in South Africa.

The example of Volkens' examined has no nuts, but is *F. gracilis* or a very closely allied species.

3. **F. clandestina,** *Boeck. in Linnæa*, xxxvii. 82. Glabrous. Rhizome creeping, 4–6 in. long, woody, clothed with nearly black lanceolate scales. Stems solitary, scarcely 1 in. long in examples seen. Leaves several up to 2$\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{5}$ in. Head of 1–3 few-flowered spikelets; bracts $\frac{1}{4}$–$\frac{1}{2}$ in. long, elliptic-oblong, enclosing the head. Spikelets $\frac{1}{4}$ in. long; glumes oblong-lanceolate, $\frac{1}{5}$ in. long, striate. Style long; branches 3, long. Gynophore obconic. Nut not seen.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 637. *Cyperus clandestinus*, Hochst. ex Krauss in Flora, 1842, 594. *Chamæxiphium clandestinum*, Hochst. in Flora, 1844, 102.

Nile Land. Abyssinia: Mountains of Samen Province; *Schimper*, 980!

13. **FUIRENA,** Rottb.; Benth. et Hook. f. Gen. Pl. iii. 1053 (including *Pentasticha*, Turcz.; Benth. et Hook. f. l.c. 1049).

Spikelets of many flowers, mostly 2-sexual and perfecting nuts, the uppermost imperfect or sterile. Glumes imbricated on all sides, or sometimes appearing twisted and 5-ranked, hairy on the back (except

in *F. abnormalis*), nearly always with a long terminal bristle. Hypogynous bristles (in typical *Fuirena*) 6, viz. 3 (sepals) linear, small or obsolete opposite the angles of the nut, 3 (petals) prominent, opposite the faces of the nut, ovate, obovate, or clawed petal-shaped; but in many species (Sect. *Hemiscirpus*) the hypogynous bristles are setulose or 0, exactly as in *Scirpus* (with *Isolepis*). Style linear, often short, with 3 long branches; style-base usually persistent on the nut, pyramidal, triquetrous, or ovoid, or linear-cylindric or very minute. Nut sessile, trigonous, obovoid or narrowly obovoid, falling off (*Eu-Fuirena*) enclosed by the 3 inner hypogynous bristles (petals).—Stem triquetrous, nodose, with leaves throughout its length; sheaths cylindric; the lowest bract like the topmost sheath. Inflorescence paniculate-corymbose (not umbelled); panicle (when fully developed) elongate, thin, with remote lower branches; but often reduced nearly to a subterminal head, not rarely to few (or 3) spikelets.

Species 26, in all warm countries.

Fuirena is here separated from *Scirpus* by its nodose stem, and inflorescence not umbellate; this separates it from all the Tropical African species of *Scirpus*. The glumes being hairy on the back afford an additional distinction between *Fuirena* and *Scirpus*, except in our *Fuirena abnormalis*.—It may be noticed, from the synonymy cited, that authors well entitled to their opinion place in *Scirpus* various species of our *Fuirena*, Sect. *Hemiscirpus*.

*Hemiscirpus.—Hypogynous bristles either 0 or linear and retrorse-scabrid.

Hypogynous bristles 0, or quite rudimentary and obscure.	
Glumes glabrous	1. *F. abnormalis.*
Glumes hairy; nut white.	
Leaves very narrow; glumes 5-ranked . .	3. *F. Welwitschii.*
Leaves up to $\frac{1}{4}$ in. broad; glumes imbricated on all sides.	
Spikelets $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{5}$ in.	2. *F. pubescens.*
Spikelets up to $\frac{2}{3}$ by $\frac{1}{4}$ in.	4. *F. pachyrrhiza.*
Spikelets $\frac{1}{4}$ by scarcely $\frac{1}{12}$ in. . . .	5. *F. pygmæa.*
Hypogynous bristles 6–4–3, longer than the nut, linear, rigid, brown, retrorsely scabrous.	
Spikelets brown; glumes 5-ranked; nut brown .	6. *F. stricta.*
Spikelets black-green; glumes not 5-ranked; nut green	7. *F. chlorocarpa.*

**Eu-Fuirena.—Three interior hypogynous bristles with a broad lamina.

Annuals.	
Spikelets $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{6}$ in.	8. *F. glomerata.*
Spikelets $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{16}$–$\frac{1}{10}$ in.	9. *F. leptostachya.*
Perennials with a stout, creeping rhizome.	
Inner hypogynous bristles obovate, sessile .	10. *F. umbellata.*
Inner hypogynous bristles with a ciliate claw .	11. *F. cinerascens.*

1. **F. abnormalis,** *C. B. Clarke.* A glabrous annual, the panicle branches minutely scabrous. Stems tufted, 18 in. long, with nodes throughout their length. Leaves 4 by $\frac{1}{3}$ in. Panicle 7 by 2 in., with distant axillary peduncles, several from each bract; lowest bract similar

to the topmost leaf. Spikelets $\frac{1}{3}$ by $\frac{1}{6}$ in., mostly short-pedicelled. Glumes boat-shaped, ovate, obtuse, retuse, pale brown, glabrous, the green stout keel excurrent in a recurved mucro $\frac{1}{3}$ the length of the glume. Hypogynous bristles 0. Nut $\frac{2}{3}$ the length of the glume, triquetrous, broadly obovoid truncate almost retuse, black, with obscure transverse wavy lines; beak or style-base minute; style short, branches 3, long.

Mozamb. Dist. British Central Africa: Boruma, on the Zambesi, *Meyharth*, 1060!

This is put in *Fuirena* because of the nodose stem and elongate panicle. Neither the glabrous glumes, nor the nut, nor the defect of hypogynous bristles suit *Fuirena* well.

2. **F. pubescens,** *Kunth, Enum.* ii. 182. Hairy, especially the inflorescence. Rhizome long-creeping, $\frac{1}{10}$–$\frac{1}{8}$ in. thick. Stems often solitary, 4–16 in. long, triquetrous, with nodes throughout their length. Leaves 6 in. by $\frac{1}{8}$–$\frac{1}{4}$ in., ultimately often pendent; base broad with a prominent ligule; lowest bracts similar to the topmost leaf. Panicle 10 by 2 in., with remote peduncles, but often reduced to 1 or 2 few-flowered subterminal always corymbose not umbelled clusters. Spikelets ovoid or broad-ellipsoid, $\frac{1}{4}$–$\frac{1}{3}$ in. long, usually $\frac{1}{5}$ in. broad, not 5-ranked. Glumes broad-elliptic, obtuse, hairy without, 3–5-ribbed, blackish-green on the sides; bristle $\frac{1}{3}$–$\frac{1}{2}$ the length of the glume. Hypogynous bristles 0, or quite rudimentary. Nut less than $\frac{1}{2}$ the length of the glume, triquetrous, narrowly obovoid, crowned by a scabrid triquetrous narrowly pyramidal style-base; outermost cells forming ultimately a marble white minutely reticulated loose coat; style 3-fid.—A. Rich. Tent. Fl. Abyss. ii. 497; Boeck. in Linnæa, xxxvii. 104, and in Flora, 1879, 566; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 160; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 665, in Durand & Schinz, Conspect. Fl. Afr. v. 648, in Dyer, Fl. Cap. vii. 261; Ficalho & Hiern in Trans. Linn. Soc. ser. 2, Bot. ii. 28; Engl. Hochgebirgsfl. Trop. Afr. 146; K. Schum. in Engl. Pfl. Ost-Afr. C. 126; Rendle in Cat. Afr. Pl. Welw. ii. 128. *Scirpus pubescens*, Lam. Ill. i. 139; Cosson & Durieu, Expl. Scient. Algér. Glum. 237; J. Ball in Journ. Linn. Soc. xvi. 703.

Nile Land. Abyssinia: Begemeder; near Selaneko, 8800 ft., *Schimper*, 1296! and without precise locality, *Roth!* British East Africa: Gazelle River, *Schweinfurth*, 1164! Ukamba, 5000–6000 ft., *Scott-Elliot*, 6523!

Lower Guinea. Angola: Golungo Alto; in marshy meadows by the River Cassaballa, *Welwitsch*, 7116! German South-west Africa: Hereroland; *Dinter*, 425!

Mozamb. Dist. German East Africa: Tanga, *Volkens*, 23! British Central Africa: Nyasaland; Nyika Plateau, 6000–7000 ft., *Whyte*, 203! Namasi, *Cameron*, 11! and without precise locality, *Buchanan*, 1453!

Extends from Portugal and Corsica to South Africa and India.

3. **F. Welwitschii,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 161. Stems rather slender, closer together on the rhizome. Leaves narrower, upper scarcely $\frac{1}{8}$ in. broad, very erect. Inflorescence usually reduced to 1 or 2 subterminal heads. Spikelets oblong-ellipsoid, about $\frac{1}{6}$ in.

broad, brownish. Glumes appearing more or less distinctly 5-ranked; otherwise as *F. pubescens*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 649, and in Trans. Linn. Soc. ser. 2, Bot. iv. 54; Rendle in Cat. Afr. Pl. Welw. ii. 128. *F. Buchanani*, Boeck. Cyp. Novæ, i. 20; K. Schum. in Engl. Pfl. Ost-Afr. C. 126. *F. pubescens*, var. *Buchanani*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 648.

Lower Guinea. Angola: Pungo Andongo; marshes near Quibanga, *Welwitsch*, 7108! Huilla; damp slopes of Morro de Monino, *Welwitsch*, 7109! near Lopollo, *Welwitsch*, 7114! dry hills near Eme, *Welwitsch*, 7115!

Mozamb. Dist. British Central Africa: Urungu; Fwambo, 5250 ft., *Nutt!* Nyasaland; Shire Highlands, *Buchanan!* and without precise locality, *Buchanan*, 1435! 1442!

The development of the panicle varies so much in *Fuirena*, that I do not think species can be maintained on the character of a single compound head.

4. **F. pachyrrhiza**, *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 161. Rhizome stout, about $\frac{1}{5}$ in. thick. Panicle and glumes minutely hairy. Spikes and glumes rather larger than in *F. pubescens*; nut smaller, with narrower style-base; outermost cells granular, subelliptic in obscurely vertical series; otherwise as *F. pubescens*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr v. 647 and in Dyer, Fl. Cap. vii. 262; K. Schum. in Engl. Pfl. Ost-Afr. C. 126; Rendle in Cat. Afr. Pl. Welw. ii. 129. *F. macrostachya*, Boeck. in Engl. Jahrb. v. 507. *Fuirena* aff. *F. pubescenti*, Oliver in Trans. Linn. Soc. xxix. 168.

Nile Land. British East Africa: Ukamba, 6000 ft., *Scott-Elliot*, 6728!

Lower Guinea. Angola: Pungo Andonga, 2500–4000 ft., *Welwitsch*, 7117! 7118! 7119!

Mozamb. Dist. German East Africa: Urundi, *Scott-Elliot*, 8301! Uyanzi; in the Mgunda Mkhali, at Jiwa la Mkoa, *Speke & Grant!* Lake Tanganyika, *Cameron*! Unyamwezi; Gonda, *Boehm*, 73. British Central Africa: Nyasaland; Shire Highlands, *Scott-Elliot*, 8481!

Also in South Africa.

5. **F. pygmæa**, *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 160. Hairy, at least the panicle and glumes, annual. Stems tufted, 5–20 in. long, slender, with nodes (bearing either leaves or bracts) in the upper part. Leaves 2–6 by $\frac{1}{16}$–$\frac{1}{8}$ in. Inflorescence (in Ridley's type) about 1 in. long and broad, of a terminal cluster of 7 spikelets, and an axillary branched peduncle carrying in all 8 spikelets; but, in Menyharth's examples there are distant axillary heads forming a long panicle. Spikelets $\frac{1}{4}$ by $\frac{1}{20}$–$\frac{1}{16}$ in. Glumes with a bristle $\frac{1}{2}$ their length. Hypogynous bristles 0 or rudimentary. Style with three branches. Nut hardly $\frac{1}{2}$ the length of the glume, trigonous, obovoid, smooth, brown finally black; beak (or style-base) cylindric, very narrow; outermost cells elliptic, transverse, obscure.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 648 including var. *β Menyharthi*; Rendle in Cat. Afr. Pl. Welw. ii. 128.

Lower Guinea. Angola: Pungo Andongo; in sandy marshes near Sansamanda, and between Mopopo and Sansamanda, *Welwitsch*, 7111! 7171! Huilla; in damp places at Monino, *Welwitsch*, 7112!

Mozamb. Dist. British Central Africa: Boruma, on the Zambesi, *Menyharth*, 1062!

6. **F. stricta,** *Steud. Syn. Pl. Glum.* ii. 128. Hairy, at least the backs of the glumes. Rhizome 0, or sometimes $\frac{1}{2}$ in. long, very slender. Stems tufted, about 12 in. long, slender, with nodes and leaves throughout their length. Leaves 1–2 by $\frac{1}{8}$–$\frac{1}{6}$ in. Clusters of spikelets usually 3–1, not more than 3 in. from the top of the stem, subsessile of 6–3–1 spikelets. Spikelets $\frac{1}{2}$ by $\frac{1}{8}$ in. Glumes more or less 5-ranked apparently, elliptic-lanceolate, brown; keel green, excurrent in a minute mucro. Hypogynous bristles 6, 5 or 3, longer than the nut, stiff, brown, linear, strongly retrorse-scabrid. Style 3-fid. Nut more than $\frac{1}{2}$ the length of the glume, narrowly obovoid, stalked, trigonous, smooth, brown; beak cylindric, very narrow.—Boeck. in Linnæa, xxxvii. 99; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 648; K. Schum. in Engl. Pfl. Ost-Afr. C. 126. *Pentasticha madagascariensis*, Turcz. in Bull. Soc. Nat. Mosc. xxxv. ii. 330; Benth. in Benth. et Hook. f. Gen. Pl. iii. 1049.

Upper Guinea. Senegambia, *Perrottet!* Niger Territory: Nupe, *Barter*, 1562!

Nile Land. British East Africa: Kavirondo, *Scott-Elliot*, 6475!

Mozamb. Dist. British Central Africa: Nyasaland; Namasi, *Cameron*, 25!

Also in Madagascar and the Comoro Isles.

7. **F. chlorocarpa,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 159. Spikelets black-green. Glumes ovate, acute, not at all 5-ranked, the keel distinctly excurrent. Nut a greenish yellow; otherwise as *F. stricta*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 645, and in Dyer, Fl. Cap. vii. 262; Durand & Schinz, Études Fl. Congo, i. 307.

Nile Land. Abyssinia: Begemeder; Reb Valley, near Senka Berr, 6800 ft., *Schimper*, 1293!

Lower Guinea. Congo: Lower Congo; Stanley Pool, 1000 ft., *Hens*, 373! Angola: Huilla; marshy places at Lopollo, *Welwitsch*, 7113!

Also in Madagascar and South Africa.

8. **F. glomerata,** *Lam. Ill.* i. 150. Annual, hairy. Stems 4–16 in. long, rather slender. Leaves 4–6 by $\frac{1}{5}$ in. Panicle oblong, thin, of a few often approximated clusters. Spikelets $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{6}$ in. Glumes dark green to dull brown, 3-nerved, keel excurrent in a long bristle. Hypogynous bristles 3 or 6; outer (sepals) linear or 0; 3 inner (petals) as long as the nut, quadrate, toothed, brown, on a long linear claw, falling with the nut, 3-nerved. Nut $\frac{1}{2}$ the length of the glume, ovoid, triquetrous, acuminate at the top and base, smooth, pallid; beak cylindric, very narrow. Style 3-branched.—Kunth, Enum. ii. 184; Benth. in Hook. Niger Fl. 553; Boeck. in Peters, Reise Mozamb. Bot. 545, in Linnæa, xxxvii. 107; Ridley in Trans. Linn. Soc. ser. 2. Bot. ii. 160; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 666, and in

Durand & Schinz, Conspect. Fl. Afr. v. 646; Rendle in Cat. Afr. Pl. Welw. ii. 128. *F. canescens*, Vahl, Enum. ii. 385. *F. ciliaris*, Roxb. Fl. Ind. i. 180; K. Schum. in Engl. Pfl. Ost-Afr. C. 126. *F. ochreata*, Nees in Linnæa, ix. 288; Kunth, Enum. ii. 184. *F. ciliata*, Steud. Syn. Pl. Glum. ii. 126. *F. Hildebrandtii*, Boeck. in Flora, 1882, 15. *Scirpus ciliaris*, Linn. Mant. 182.

Upper Guinea. Senegambia: near Richard Toll, *Roger!* and without precise locality, *Leprieur! Heudelot*, 556! Sierra Leone: Mahela, *Scott-Elliot*, 3982! Gold Coast: Accra, *Don! Brown*, 365! Lagos Island, *Barter*, 2224!

Nile Land. British East Africa: Sabaki River, *Gregory!* Mombasa, *Taylor!*

Lower Guinea. Angola: Loanda; at Represa de Maghelaos, rare, *Welwitsch*, 7107!

Mozamb. Dist. Zanzibar, *Bojer!* German East Africa: Usambara, *Holst*, 2040! 2737! Portuguese East Africa: Mozambique, *Peters!* Quilimane, *Kirk!* Lower Zambesi; Shupanga, *Kirk! Stewart!*

Also in Madagascar, India, East Asia, and Australia.

Var. *angolensis*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 647. Three interior hypogynous bristles with a much smaller hardly quadrate lamina.—*F. ciliaris*, var. *angolensis*, Schinz in Bull. Herb. Boiss. iv. Append. iii. 31.

Nile Land. British East Africa: Athi, *Gregory*, 102!

Lower Guinea. Angola: Gambos, *Newton!* Huilla to Humpata, *Johnston!* Amboland; *Rautanen!*

In this variety, the hypogynous bristles are as, or very nearly as, in *F. leptostachya*; but the spikelets are fully as large as in typical *F. glomerata*.

9. **F. leptostachya,** *Oliver in Trans. Linn. Soc.* xxix. 168, *t.* 108. *fig. B.* Leaves often 4–8 in. long. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{16}$–$\frac{1}{10}$ in. Hypogynous bristles (3 interior or petals) as long as the nut, linear, with a very small lamina which is oval, or with 2 recurved teeth.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 647, incl. var. *β nudiflora*; K. Schum. in Engl. Pfl. Ost-Afr. C. 126. *F. glomerata*, Boeck. in Flora, 1879, 566, not of Lam. *F. schweinfurthiana*, Boeck. in Flora, 1880, 438. *Fuirena* sp. n. 3, T. Thoms. in Speke, Journ. Append. 654.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, ser. iii. 190! Bongo; Gir, *Schweinfurth*, 2504! Madi, *Speke and Grant!*

Mozamb. Dist. British Central Africa: Nyasaland; Tanganyika Plateau, at Fort Hill, 3500 ft., *Whyte!*

In Schweinfurth's 2504 I have found no hypogynous bristles, and formerly distinguished it as var. *nudiflora*. The plant is young, and the bristles may perhaps not yet be developped; but if there should prove to be no bristles in this plant, I should hardly esteem it as more than an accidental state of *F. leptostachya*.

10. **F. umbellata,** *Rottb. Descr. et Ic.* 70, *t.* 19, *fig.* 3. Hairy, at least the glumes. Rhizome stout, horizontal, woody. Stems $1\frac{1}{2}$–5 ft. long, robust, with nodes throughout their length. Leaves up to 6 by $\frac{1}{2}$ in., less often $\frac{1}{4}$ in. broad. Panicle long oblong, often with many axillary compound corymbs and 200–600 spikelets. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{8}$–$\frac{1}{6}$ in.,

green or dull chestnut-coloured. Glumes elliptic; keel excurrent in a curved bristle. Hypogynous bristles: outer 3 (sepals) linear, small or 0; inner 3 as long as the nut, obovate truncate, sessile or hardly clawed. Style linear; branches 3, linear. Nut about $\frac{1}{2}$ the length of the glume, triquetrous, ovoid, acuminate at the top and at the base, smooth, pallid, ultimately brown; beak small, cylindric, very narrow.—Kunth, Enum. ii. 185; Benth. in Hook. Niger Fl. 553; Boeck. in Peters, Reise Mossamb. Bot. 545, in Linnæa, xxxvii. 110, and in Flora, 1879, 566; Oliver in Trans. Linn. Soc. xxix. 168; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 666, and in Durand & Schinz, Conspect. Fl. Afr. v. 648; Henriques in Bolet. Soc. Brot. v. 209; Durand & Schinz, Études Fl. Congo, i. 308; K. Schum. in Engl. Pfl. Ost-Afr. C. 126; Durand & De Wild. Comptes-rendus Soc. bot. Belg. xxxvi. 90; Urban, Symb. Antill. ii. 97; Rendle in Cat. Afr. Pl. Welw. ii. 129. *F. paniculata*, Linn. f. Suppl. 105. *F. pentagona*, Schumach. Beskr. Guin. Pl. 42. *F. canescens*, Steud. Syn. Pl. Glum. ii. 128, not of Vahl.

Upper Guinea. Senegal, *Perrottet*, 814! Sierra Leone; by the Kabele River, *Scott-Elliot*, 4929! and without precise locality, *Afzelius!* Guinea, *Isert! Jardin!* Liberia: Bassa Cove, *Ansell!* Lagos: Abeokuta, *Irving!* Niger Territory: Nupe, *Barter*, 418! 1016! Niger Delta; Nun River, *Vogel*, 43! 61! Cameroons: Cameroon River, *Mann*, 777! Yaunde, *Zenker & Staudt*, 632! *Zenker*, 1512!

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2192! 2407! Niamniam; Yubbo River, *Schweinfurth*, 3724! Madi, *Speke & Grant*, 721!

Lower Guinea. Island of St. Thomas, *Don!* Loango: near Chinchoco, *Soyaux*, 201! Lower Congo, Lutete, 1800 ft., *Hens*, 198! Kisantu, *Gillet*, 368! and without precise locality, *Smith*, 324! Angola: Golungo Alto; by streams near Golungo Alto and Sange, *Welwitsch*, 7121! Pungo Andongo; near the River Cuanza, *Welwitsch*, 7120!

South Central. Congo Free State: Kassai River, *Luja*, 218!

Mozamb. Dist. Zanzibar, *Kuntze*, 285! German East Africa: Zanguebar, *Kirk!* Tanga, *Holst*, 2028! British Central Africa: Nyasaland; Tanganyika Plateau, at Fort Hill, 3500–4000 ft., *Whyte!* Mbame Hill, 3000 ft., *Kirk!* Shire Highlands, *Buchanan*, 9! and without precise locality, *Buchanan*, 1133! *Whyte*, 75!

Very common in all tropical and subtropical regions.

11. **F. cinerascens,** *Ridley in Trans. Linn. Soc. ser. 2, Bot.* ii. 161, *name only*. Hairy, at least the glumes. Rhizome creeping. Stems 12–16 in. long, with nodes throughout their length. Leaves 2–4 by $\frac{1}{3}$–$\frac{1}{3}$ in. Panicle oblong, with distant peduncles bearing 15–60 spikelets. Spikelets 3–6 together, $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., subcylindric, black-green. Glume elliptic, with a long recurved bristle. Inner 3 hypogynous bristles as long as the nut, obovate, strongly 3-nerved, with a terminal crest, lateral wings and a ciliate claw. Nut $\frac{1}{2}$ the length of the glume, triquetrous, ovoid, acuminate at the top and at the base, smooth, pallid; beak small, cylindric, very narrow.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 645; Rendle in Cat. Afr. Pl. Welw. ii. 129; K. Schum. in Engl. Pfl. Ost-Afr. C. 126. *F. calolepis*,

K. Schum. in Engl. Jahrb. xxiv. 339, t. 5, fig. H–M; in Engl. Pfl. Ost-Afr. C. 126.

Lower Guinea. Angola: Huilla; damp meadows at Catumba, *Welwitsch*. 7110!

Mozamb. Dist. Zanzibar, *Bojer! Hildebrandt*, 1057! *Stuhlmann*, ii. 52! Zanguebar, *Kirk*, 62! Usambara; Kibafula swamp, *Holst*, 2133! Usaramo; Dar es-Salaam, *Kuntze*, 283!

Also in Madagascar.

Imperfectly known species.

12. **F. nana,** *A. Rich. Tent. Fl. Abyss.* ii. 497. Annual, small. Stem 1–3 in. long, almost capillary, smooth, glabrous. Leaves shorter than the stem, linear, subobtuse, scabrous on the margins. Spikes usually 2, small, terminal, sessile, close together; bracts 1–2, unequal, overtopping the spikes. Glumes numerous, closely imbricated, oboval, obtuse, long acuminate. Nut ellipsoid-oblong, obtuse, terete, very slenderly grooved, glabrous. Scales and hypogynous bristles 0.—Engl. Hochgebirgsfl. Trop. Afr. 147.

Nile Land. Abyssinia: Shireh; near Kouaieta (Kuayata), *Quartin-Dillon* (ex *A. Richard.*)

14. **LIPOCARPHA,** R. Br.; Benth. et Hook. f. Gen. Pl. iii. 1054.

Glumes densely packed in the spikelet, very numerous, imbricated on all sides; 2 lowest empty, succeeded by many bearing 2-sexual nut-bearing flowers deciduous in fruit, uppermost imperfect. Within the glume, parallel with it, 2 elliptic or obovate hyaline scales, rather shorter than the glume, are invariably present and wrapped round the nut. Style small linear or 0, branches 3 (rarely 2) minute or short. Nut sessile, obovoid or linear-oblong, unequally trigonous, smooth, dark brown; style deciduous, style-base 0. Glabrous. Stem without any nodes between the basal leaves, and the 1 head of 3–15 spikelets.

Species 14; in the warmer portions of both hemispheres.

There is no genus of *Cyperaceæ* concerning which more diverse views have been held or more diverse explanations given of the very uniform structure. The 2 anticous and posticous hyaline scales cannot very well be prophylla (bracteoles), of which no trace occurs in the whole Order (unless in *Ascolepis?*).

Three explanations are in the field, viz.:

(*a*) that *Lipocarpha* is allied to (the older botanists thought equal to) *Hypolytrum*; the 2 hyaline scales being supposed homologous with the 2 male glumes in *Hypolytrum*. Goebel, however, has shown that the female flower in *Hypolytrum* is terminal; and the difference in habit between *Lipocarpha* and *Hypolytrum* is extreme.

(*b*) that *Lipocarpha* is allied to *Scirpus*; that the 2 hyaline scales represent the hypogynous bristles which have become connate in two fused bundles. This is Bentham's view; and *Lipocarpha* is in the highest degree like *Scirpus*, Sect. *Microstyli*, of which it has the nut and style, and with which it is frequently confused.

(*c*) that the 2 hyaline scales represent 2 sterile lower flowers, so that what is called here a flower is really a spikelet of 3 flowers, whereof the 2 lower are barren. This

view was started by Kunth, and Theo. Holm writes to me that after a prolonged investigation he is decisively of the same opinion. If this is so, *Lipocarpha* must be remote from every other genus.

Spikelets terete, smooth; glumes with obtuse triangular tips incurved in fruit.
Nut about $\frac{1}{2}$ the length of the glume; style $\frac{2}{3}$ the length of the nut . . . . . 1. *L. argentea.*
Nut $\frac{3}{4}$ the length of the glume; style 0, the 3 branches just united.
Nut oblong; lower hyaline scale narrow-elliptic.
Stem very slender, with 3–1 spikelets . . 2. *L. filiformis.*
Stem medium-sized, with 3–18 spikelets . . 3. *L. triceps.*
Nut obovoid; lower hyaline scale suborbicular . 4. *L. prieuriana.*
Spikelets hispid; glumes acuminate with linear tips suberect in fruit.
Medium-sized plants with stolons.
Stolons very slender; spikelets pallid or cinnamon-coloured . . . . . 5. *L. albiceps.*
Stolons rather stout; spikelets purple-yellow . 6. *L. purpureolutea.*
Small plants; stolons 0.
Stems 4–8 in. long, slender, with 5–1 spikelets . 7. *L. atra.*
Stems less than 1 in. long, with 1 spikelet . . 8. *L. multibracteata.*
Spikelets squarrose; glumes with a long linear tip recurved in fruit.
Stems 12–20 in. long, rather robust; spikelets obscurely squarrose . . . . . 9. *L. Barteri.*
Stems 4–14 in. long, slender; spikelets strongly squarrose . . . . . 10. *L. pulcherrima.*

1. **L. argentea,** *R. Br. in Tuckey, Congo, Append.* 459. Glabrous. Rhizome usually 0, sometimes up to $1\frac{1}{2}$ in. long. Stems tufted, 4–24 in. long, round-trigonous, smooth, with no nodes between the basal leaves and single head. Leaves sometimes as long as the stem, often only $\frac{1}{3}$ its length, $\frac{1}{8}$–$\frac{1}{6}$ in. broad, rather fleshy at the base. Spikelets 3–10, $\frac{1}{4}$–$\frac{1}{2}$ by $\frac{1}{6}$ in., ovoid or cylindric, obtuse, terete, not rough from excurrent points of glumes, white; bracts 3–2, horizontal, lowest 1–4 in. long and similar to the leaves. Glumes very dense in numerous spirals, obovate, with obtuse triangular tips, erect or incurved in fruit, thick in texture. Hyaline scales shorter than the glume; lower anticous narrow-elliptic and 5-veined, upper posticous oblong and 3-veined. Stamens usually 2; anthers narrowly oblong, muticous. Style linear, $\frac{2}{3}$ the length of the nut; branches 3–2, very short, scarcely exserted. Nut about $\frac{1}{2}$ the length of the hyaline scale, trigonous-compressed, oblong-obovoid, brown-black, smooth.—Kunth, Enum. ii. 266; Benth. in Hook. Niger Fl. 555; Boeck. in Linnæa, xxxvii. 114 partly (i.e. excl. the American examples), in Flora, 1879, 567, and in Engl. Gazelle Reise, Bot. 14; T. Thoms. in Speke, Nile, Append. 654; Oliver in Trans. Linn. Soc. xxix, 169; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 163; Goeb. in Ann. Jard. Buit. vii. 131, t. 14, fig. 18, t. 15, fig. 19–20; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 667, in Durand & Schinz, Conspect. Fl. Afr. v. 649, and in Dyer, Fl. Cap. vii. 265; Durand and Schinz, Études Fl. Congo, i. 308; Durand and De Wild. in

Comptes-rendus Soc. bot. Belg. xxxvi. 90; Rendle in Cat. Afr. Pl. Welw. ii. 129. *Scirpus senegalensis*, Lam. Ill. i. 140. *Hypælyptum argenteum*, Vahl, Enum. ii. 283. *H. senegalense*, K. Schum. in Engl. Pfl. Ost-Afr. C. 127. *Hypolytrum senegalense*, Pers. Syn. i. 70.

Upper Guinea. Senegal, *Dupuis!* Sierra Leone: near Franziga, *Scott-Elliot*, 5044! and without precise locality, *Don! Vogel! Barter!* Lagos: Shaki, *Lagos Government*, 2!

Nile Land. Abyssinia: Begemeder, *Schimper*, 1301! British East Africa: Gazelle River, at Meshra, *Schweinfurth*, 1333! Jur; Jur Ghattas, *Schweinfurth*, 1461! Madi; below Madi rocky heights, *Speke & Grant*, 684!

Lower Guinea. Lower Congo: Bingila, *Dupuis!* Lutete, 1750 ft., *Hens*, 71! 254! Kisantu, *Gillet*, 521! 547! and without precise locality, *Smith!* Angola: Pungo Andonga; in the rocky valleys of the Præsidium at the stream of Calunda, *Welwitsch*, 6778! Huilla: ponds near Monino, *Welwitsch*, 6777! *Humpata, Newton*, 12! 13!

Mozamb Dist. German East Africa: Karagwe, *Scott-Elliot*, 7474! British Central Africa: Nyasaland; North Nyasa, *Scott! Whyte!* Namasi, *Cameron*, 23! and without precise locality, *Buchanan*, 1180!

Also in South Africa, the Mascarene Islands, Asia and Australia.

2. **L. filiformis,** *Kunth, Enum.* ii. 267. Glabrous. Stems annual, tufted, 2–8 in. long, very slender. Leaves few, $\frac{1}{3}$ the length of the stem, linear or setaceous. Head of 3–1 spikelets; bracts 2, the lower 1 in. long, horizontal, linear. Spikelets $\frac{1}{4}$ by $\frac{1}{8}$ in., cylindric, obtuse, dense, white or more or less purple spotted, smooth. Glumes broadly ovate, obtuse, their tips erect or incurved in fruit. Hyaline scales a little shorter than the glume. Stamen 1. Nut almost as long as the hyaline scales, oblong or narrowly obovoid, plano-convex, black-brown, smooth. Style 0, or hardly any; branches 3, minute, linear, hardly exserted.—Boeck. in Linnæa, xxxvii. 117; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 650. *Hypælyptum filiforme*, Vahl, Enum. ii. 284; Schumach. Beskr. Guin. Pl. 31. *Scirpus filiformis*, Poir. Encycl. Suppl. v. 102, not of Lam. *Fimbristylis filiformis*, Thonning ex Kunth, Enum. 267.

Upper Guinea. *Thonning!* Senegal, *Heudelot!*

3. **L. triceps,** *Nees in Wight, Contrib.* 92. Glabrous. Stems annual, tufted, 4–16 in. long, trigonous, striated, smooth. Leaves $\frac{1}{4}$ to $\frac{1}{2}$ the length of the stem, linear. Spikelets 3–18 in the head, $\frac{1}{3}$ by $\frac{1}{8}$ in., cylindric, very dense, obtuse, smooth, usually purple or dark reddish, sometimes paler; bracts 3–7, spreading, up to 1–4 in. long. Glumes obovate, with a triangular tip erect or incurved in fruit. Hyaline scales a little shorter than the glumes, lower narrowly elliptic, upper oblong. Nut broadly-oblong, round-trigonous, nearly as long as the hyaline scale, black-brown, smooth. Style 0 or hardly any; branches 3, linear, shortly exserted.—*L. sphacelata*, Kunth, Enum. ii. 267; Benth. in Hook. Niger Fl. 555; Boeck. in Flora, 1860, 37, in Linnæa, xxxvii. 116; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 162; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 667, and in Durand & Schinz,

Conspect. Fl. Afr. v. 650, incl. var. β *Barteri*; Rendle in Cat. Afr. Pl. Welw. ii. 129. *Hypælyptum sphacelatum*, Vahl, Enum. ii. 283. *Tunga triceps*, Roxb. Fl. Ind. i. 183. *Kyllinga triceps*, Lam. Ill. i. 148, t. 38, fig. 2.

Upper Guinea. Senegal, *Schotte!* Liberia: Cape Palmas, *Ansell!* Niger Territory: Nupe, *Barter*, 344! 786!

Lower Guinea. Lower Congo: Stanley Pool, Luja, 65! Angola: Pungo Andongo; near Mopopo, on the River Cuanza, *Welwitsch*, 6776!

Also in India and Tropical America.

South Central. Congo Free State: Kasai River, *Luja*, 225!

This species was sorted from *L. argentea* (the white-headed) by its deep purple-spotted (sphacelate) heads; but the character is not a safe one any more than the number of spikelets (*triceps*). The length of the style draws a strong line between the two; *L. triceps* differs little from *L. filiformis* except in being more robust.

4. **L. prieuriana,** *Steud. Syn. Pl. Glum.* ii. 130. Glumes broadly obovate, very obtuse. Lower hyaline scale ovate, almost orbicular, 5-nerved. Nut obovoid-globose; otherwise as *L. triceps.*—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 650. *L. schweinfurthiana*, Boeck. in Flora, 1879, 567.

Upper Guinea. Senegal, *Leprieur! Perrottet!* 199!

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, ser. iii. 197!

5. **L. albiceps,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 163. Glabrous. Stolons slender, clothed by small ovate-lanceolate scales. Stems 8–16 in. long, slender. Leaves 2–8 in. long, linear. Head of 7–1 spikelets; bracts 3–2, spreading, lowest 2 in. long, linear. Spikelets $\frac{1}{4}$ by $\frac{1}{6}$ in., ovoid, white or cinnamon-coloured, dense, appearing hispid from the suberect points of the glumes. Glumes oblong-obovate suddenly acuminated into a linear tip $\frac{2}{3}$ the length of the glume. Hyaline scales nearly as long as the glume (without its tip); the lower quadrate-elliptic, 7-nerved; the upper elliptic, 3-nerved. Stamens 2. Nut $\frac{3}{5}$ the length of the hyaline scale, oblong-obovoid, unequally trigonous, brown-black, smooth. Style more than $\frac{1}{2}$ the length of the nut, linear; branches 3, linear, exserted.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 649; Rendle in Cat. Afr. Pl. Welw. ii. 129. *Hypælyptum albiceps*, K. Schum. in Engl. Pfl. Ost-Afr. C. 127.

Lower Guinea. Angola: Pungo Andongo; by the River Cuanza, at Muta Lucala, *Welwitsch*, 6782! spongy slopes of the Præsidium, *Welwitsch*, 6785 partly near Catete and Sansamanda, *Welwitsch*, 6786!

Mozamb. Dist. British Central Africa: Nyasaland; Mandala, *Scott-Elliot*, 8462! Shire Highlands, *Buchanan*, C! Namasi, *Cameron*, 10!

6. **L. purpureolutea,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 163. Stolons rather stout, hardening into a rhizome $\frac{1}{8}$ in. in diam., on which stand culms $\frac{3}{4}$ in. apart. Glumes black-red, the backs and tips

yellow; otherwise as *L. albiceps*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 650; Rendle in Cat. Afr. Pfl. Welw. ii. 129.

Lower Guinea. Angola: Huilla; in pastures near Humpata, *Welwitsch*, 6784!

This must be very close to *L. albiceps*, Ridley, and is possibly a mere form thereof. The examples of Welwitsch's 6784 are too young to form a decided opinion upon.

7. **L. atra,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 162. Glabrous. Rhizome hardly any. Stems tufted, 4–8 in. long, slender. Leaves $\frac{1}{3}$–$\frac{1}{2}$ the length of the stem, linear. Head of 5–1 spikelets; bracts 2, lower $1\frac{1}{2}$ in. long, linear. Spikelets $\frac{1}{5}$–$\frac{1}{3}$ by $\frac{1}{8}$ in., cylindric, obtuse, black, appearing minutely hispid from the very short glume-tips. Glumes very small, obovate, suddenly acuminated into a lanceolate-linear tip $\frac{1}{3}$ the length of the glume, nearly black, the tip a brown-black. Hyaline scales nearly as long as the glume (without its tip); lower narrowly elliptic; upper oblong. Nut minute, $\frac{2}{3}$ the length of the hyaline scale, oblong-ellipsoid, trigonous, smooth, brown-black. Style less than $\frac{1}{2}$ the length of the nut, linear; branches 3, short.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 650; Rendle in Cat. Afr. Pl. Welw. ii. 129.

Lower Guinea. Angola: Huilla; banks of the River Cacolovar, near Lake Ivantala, *Welwitsch*, 6961!

8. **L. multibracteata,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 650. Glabrous. Stems annual, tufted, $\frac{1}{3}$–$\frac{2}{3}$ in. long, bearing 1 spikelet. Leaves up to $1\frac{1}{2}$ in. long, linear. Bracts 5, $\frac{1}{3}$–$\frac{2}{3}$ in. long, suberect, linear from a narrow lanceolate base. Spikelets $\frac{1}{12}$–$\frac{1}{6}$ in. long, ellipsoid, subacute, densely flowered. Glumes about $\frac{1}{20}$ in. long, oblong, tip triangular or lanceolate, scarious, spotted with dark red. Hyaline scales as long as the glume (without its tip); lower broadly obovate, truncate, 7-nerved; upper elliptic, 3-nerved. Nut nearly as long as the scales, very narrowly-oblong or almost linear, round-trigonous, smooth, brown-black. Style 0 or hardly any; branches 3, minute, linear, hardly exserted.—Rendle in Cat. Afr. Pl. Welw. ii. 130.

Lower Guinea. Angola: Huilla; in *Sorghum* fields, *Welwitsch*, 6773!

9. **L. Barteri,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 650. Glabrous. Rhizome short. Stems approximate, 12–20 in. long, robust for the genus. Leaves $\frac{1}{2}$ the length of the stem, linear, terete, leaf-sheaths brown-red, split down on one side, truncate at top. Head of 5–1 spikelets; bracts 3–2, lowest up to 2 in. long, spreading, linear. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{6}$ in., dense, cylindric, obtuse, somewhat squarrose, dusky brown-red. Glumes broadly obovate, striate, suddenly narrowed into a lanceolate-linear tip $\frac{1}{2}$ the length of the glume. Hyaline scales nearly as long as the glume (without its tip); lower broadly-elliptic; upper narrowly-elliptic. Nut nearly as long as the scales, oblong or narrow-ellipsoid, unequally trigonous, smooth, black-

brown. Style 0, or hardly any; branches 3, most minute, not exserted.

Upper Guinea. Niger Territory: Nupe, *Barter*, 1585!

10. **L. pulcherrima,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 162. Glabrous. Stems annual, tufted, 4–14 in. long, slender. Leaves as long as the stem and setaceous, or $\frac{1}{3}$–$\frac{2}{3}$ the length of the stem and linear. Head of 5–1 spikelets; bracts 3–2, similar to the leaves, spreading, lowest up to $2\frac{1}{2}$ in. long. Spikelets $\frac{1}{5}$ by $\frac{1}{10}$ in., dense, conspicuously squarrose from the recurved glume-tips. Glumes obovate, truncate, with a linear tip as long as the glume, the sides blackish-red, the back with the tip yellow-green. Hyaline scales about as long as the glume (without its tip); lower broad-elliptic; upper narrow-elliptic. Nut $\frac{3}{4}$ the length of the scales, narrowly-ellipsoid, trigonous, smooth, black-brown. Style 0, or hardly any; branches 3, minute, hardly exserted.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 650, and in Dyer, Fl. Cap. vii. 266; Rendle in Cat. Afr. Pl. Welw ii. 129. *L. tenera*, and *L. atropurpurea*, Boeck. Cyp. Novæ, i. 21. *Hypælyptum pulcherrimum*, K. Schum. in Engl. Pfl. Ost-Afr. C. 127.

Nile Land. British East Africa: Mount Kenia, *Gregory*, 87! River Tana, *Gregory*, 97!

Lower Guinea. Angola: Pungo Andongo; marshes in the Præsidium and near Quilanga, *Welwitsch*, 6774! marshes at Catete, *Welwitsch*, 6785 partly! Huilla; in *Sorghum* fields, *Welwitsch*, 6775! Huilla to Humpata, *Johnston!* River Nene, *Newton!*

South Central. Congo Free State: River Kasai, *Luja*, 220!

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 63!69!

Also in South Africa.

15. **ASCOLEPIS,** Nees; Benth. et Hook. f. Gen. Pl. iii. 1054.

Glumes densely packed in the spikelet, numerous, imbricated on all sides, minute, narrow-oblong, obtuse, hidden among the squamellæ which are larger and longer, containing perfect flowers. Squamella between the nut and the glume, parallel to the glume, with an elongate flattened conic beak, holding the nut in a hollow or pocket near its base. Style small, linear; branches 3 or 2, linear, minute. Nut very small, narrowly obovoid, trigonous or biconvex, smooth, brown-black.—Glabrous. Stem without any nodes between the basal leaves and the 1 head of 1–6 spikelets.

Species, the 9 here described; endemic in Tropical Africa, except that 1 species is also in South Africa, 1 also in Madagascar and South America.

The large squamella appears made up of 2 lateral organs coalescent completely on the anticous side, imperfectly or not at all on the posticous side. They would be 2 lateral bracteoles (prophylla), not known in any other genus of *Cyperaceæ*.

*Euascolepis.—Lower part of squamella narrow, thin, hollowed slightly to hold the nut; upper part elongate-conic. Style 3-fid.—The species of this group differ little but in the size and colour of the heads.

Heads from snow-white to a dirty straw-colour.
Heads $\frac{1}{6}$–$\frac{1}{4}$ in. in diam. . . . . 1. *A. eriocauloides.*
Heads $\frac{1}{4}$–1 in. in diam.
Heads not radiate.
Stems 6–10 in. long . . . . . 2. *A. protea.*
Stems 16–20 in. long . . . . . 6. *A. elata.*
Heads rayed . . . . . 2. *A. protea*, var. *bellidiflora.*
Heads 2–$3\frac{1}{2}$ in. in diam. . . . . 3. *A. pinguis.*
Heads golden-yellow.
Head $\frac{1}{4}$–$\frac{1}{2}$ in. in diam. . . . . 2. *A. protea*, var. *santolinoides.*
Head $\frac{3}{4}$ in. in diam.; leaves very slender . . 4. *A. anthemiflora.*
Head $\frac{1}{3}$–1 in. in diam.; leaves thicker, almost fleshy . . . . . 5. *A. speciosa.*

**Pseudo-Lipocarpha.—Squamella very broadly obovate, wrapped round the nut, the margins free (or united just at the base?). Style 3-fid.
Small plants; heads $\frac{1}{8}$–$\frac{1}{5}$ in. diam., of 1–3 distinct spikelets . . . . . 7. *A. pusilla.*

***Platylepis.—Squamella obovate, strongly flattened, with acute scarious wings, the nut in a small pocket on the posticous face. Style 2-fid.
Spikelets 1–3 to the head, much fused together; nut sessile . . . . . 8. *A. capensis.*
Spikelets usually 3–6 to the head, more distinct; nut minutely stalked . . . . . 9. *A. brasiliensis.*

1. **A. eriocauloides,** *Steud. Syn. Pl. Glum.* ii. 105 *partly.* Glabrous. Stems 2–8 in. long, slender, thickened sub-bulbous at the base. Leaves $\frac{1}{2}$ the length of the stem, linear. Head 1, hemispheric, dense, $\frac{1}{16}$–$\frac{1}{4}$ in. in diam., straw-coloured; bracts 4–3, pendent, 1–$2\frac{1}{2}$ in. long, linear, dilated just at the base. Glumes linear-lanceolate, obtuse, $\frac{1}{3}$ the length of the squamella. Squamella $\frac{1}{12}$ in. long, lanceolate linear, thick, hollowed out at the base to hold the nut. Stamen 1. Style $\frac{1}{2}$ the length of the nut, linear; branches 2 or 3. Nut $\frac{1}{50}$ in. long, narrowly obovoid, smooth, dark-brown.—Boeck. in Linnæa, xxxvii. 1; Welw. in Trans. Linn. Soc. xxvii. 75 in note; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 652; Engl. Hochgebirgsfl. Trop. Afr. 144. *Kyllinga eriocauloides*, Steud. in Flora, 1842, 597. *Isolepis Ascolepis*, A. Rich. Tent. Fl. Abyss. ii. 501.

Nile Land. Abyssinia: Gaddema, 7000 ft., *Schimper*, 106! Gafta, *Schimper*, 1195! Jelajeranne, *Schimper*, 1644! Shireh province, *Quartin-Dillon & Petit.*

2. **A. protea,** *Welw. in Trans. Linn. Soc.* xxvii. 75. Stems 4–10 in. long, slender, in strong tufts, but hardly bulbous at the base. Head $\frac{1}{4}$ to $\frac{3}{5}$ in. in diam., hemispheric or subglobose. Squamella $\frac{1}{8}$ in. long; otherwise as *A. eriocauloides.*—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 652; Engl. Hochgebirgsfl. Trop. Afr. 144; K. Schum. in Engl. Pfl. Ost-Afr. C. 127; Rendle in Cat. Afr. Pl. Welw. ii. 130. *A. eriocauloides* partly and *A. kyllingioides* partly, Steud. Syn. Pl. Glum. ii. 105.

Nile Land. Abyssinia: Shireh province, *Quartin-Dillon & Petit!*

Lower Guinea. Angola: Pungo Andongo; marshy places in the Præsidium, *Welwitsch*, 1667! Huilla; at Empelanca, *Welwitsch*, 1671! *Newton*, 2!

I can discover no difference between Welwitsch n. 1667 and the Abyssinian *A. eriocauloides* except that the former is half as large again in every part.

Var. β *bellidiflora*, Welw. in Trans. Linn. Soc. xxvii. 76. Stems 4–15 in. long, often less slender than in typical *A. protea*. Squamellæ on the outer part of the head growing out, attaining $\frac{1}{3}$–$\frac{1}{2}$ in. in length or even more; so that the rayed heads bear a remarkable resemblance to those of many *Compositæ* with numerous rows of ray-florets.—Oliver in Trans. Linn. Soc. xxix. 168, t. 110, A, fig. 1–3; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 652; Engl. Hochgebirgsfl. Trop. Afr. 144; K. Schum. in Engl. Pfl. Ost-Afr. C. 127; Rendle in Cat. Afr. Pl. Welw. ii. 130. *A. eriocauloides*, Boeck. in Flora, 1879, 564. *Antrolepis leucocephala*, Welw. Apont. 578. *A. leucantha*, Welw. in Trans. Linn. Soc. xxvii. 77. *Antrolepis* sp., T. Thoms. in Speke, Nile, Append. 654.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 1919!

Lower Guinea. Angola: Pungo Andongo; spongy slopes and heights of the Præsidium, among huge rocks, *Welwitsch*, 1667 B! 1668! Huilla; between Lopollo and Nene, *Welwitsch*, 1672!

Mozamb. Dist. German East Africa: Unyamwezi; near the River Wala, *Speke & Grant!* Urambo, *Hannington!* between Lake Tanganyika and Lake Rukwa, 600 ft., *Nutt!* British Central Africa: Nyasaland; Tanganyika Plateau, 3500–4000 ft., *Whyte!* Kondowe to Karonga, 2000–6000 ft., *Whyte!* Zomba and plains, 2500–3500 ft., *Whyte!* Shire Highlands, *Buchanan! Scott-Elliot*, 8594 bis! at the foot of Mpembe Hill, 3000 ft., *Kirk!* Mandala, *Scott-Elliot*, 8463! Namasi, *Cameron*, 11! and without precise locality, *Buchanan*, 499!

Var. γ *santolinoides*, Welw. in Trans. Linn. Soc. xxvii. 77. Head golden, globose or hemispheric, not or very slightly radiate.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 652; Engl. Hochgebirgsfl. Trop. Afr. 145; Rendle in Cat. Afr. Pl. Welw. ii. 130. *Antrolepis sulphurea*, and *A. santolina*, Welw. Apont. 578.

Lower Guinea. Angola: Pungo Andongo; spongy slopes of the Præsidium, *Welwitsch*, 1664! 1666! damp places by the River Cuanza, *Welwitsch*, 1665! Huilla; at Morro de Lopollo, 5300 ft., and near Lopollo, *Welwitsch*, 1673!

3. **A. pinguis,** *C. B. Clarke.* Stem 8–12 in. long, thick. Leaves much thicker than those of *A. protea*. Head globose, attaining $3\frac{1}{2}$ in. in diam.; outer squamellæ up to $1\frac{1}{2}$ in. long; otherwise as *A. protea*, var. *bellidiflora*.

South Central. Congo Free State: Kitope, *Descamps!* Albertville, *Descamps!*

4. **A. anthemiflora,** *Welw. in Trans. Linn. Soc.* xxvii. 77, *t.* 24, *fig.* 9–13. Stems 12–16 in. long, slender. Head $\frac{3}{4}$ in. in diam., golden, hemispheric; outer squamellæ $\frac{1}{3}$ in. long, otherwise as *A. protea*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 651; K. Schum. in Engl. Pfl. Ost-Afr. C. 127 (*anthemidiflora*); Rendle in Cat. Afr. Pl. Welw. ii. 131. *Antrolepis anthemiflora*, Welw. Apont. 578.

Lower Guinea. Angola: Pungo Andongo; banks of the River Cuije, *Welwitsch*, 1669!

Mozamb. Dist. British Central Africa: Urungu; Fwambo, 5250 ft., *Nutt! Carson*, 83! Nyasaland; Tanganyika Plateau, at Fort Hill, 3500–4000 ft., *Whyte!*

This differs from *A. protea*, var. *bellidiflora* in its golden head, from *A. protea*, var. *santolinoides* in its strongly radiate head; it might be arranged as another variety of *A. protea*. As to which forms of *A. protea* should be esteemed as "species" the latest views of Welwitsch are here followed.

5. **A. speciosa,** *Welw. in Trans. Linn. Soc.* xxvii. 78, *t.* 24, *fig.* 1–8. Rhizome $\frac{1}{2}$ by $\frac{1}{6}$ in., præmorse. Stems 6–18 in. long, rather stout, densely tufted; leaf-sheaths stout, black, finally reduced to fibres. Leaves about $\frac{1}{2}$ the length of the stem, rather stout. Head $\frac{1}{3}$–1 in. in diam., globose or hemispheric, very dense, golden, not radiate; otherwise as *A. protea*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 652, and in Bull. Herb. Boiss. iv. Append. iii. 31; Engl. Hochgebirgsfl. Trop. Afr. 145; K. Schum. in Engl. Pfl. Ost-Afr. C. 127; Rendle in Cat. Afr. Pl. Welw. ii. 131. *A. vatkeana*, Boeck. in Allgem. Bot. Zeitschr. 1896, 55.

Lower Guinea. Angola: in lofty pastures near Lopolla, 500 ft., *Welwitsch*, 1674! Ovamboland, *Höpfner*, 82!

Mozamb. Dist. British East Africa: Urungu; Fwambo, 5250 ft., *Nutt! Carson*, 66!

All the Fwambo examples differ a little from Welwitsch's Angolan type by having the stems sub-bulbous at the base.

6. **A. elata**, *Welw. in Trans. Linn. Soc.* xxvii. 79. Stems 16–20 in. long, densely tufted, rather slender, the sheaths black, ultimately torn into fibres. Leaves rather numerous, $\frac{1}{2}$ the length of the stem, linear. Head $\frac{2}{3}$ in. in diam., hemispheric, snow-white, otherwise as *A. speciosa*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 651, including var. β. *gracilior*; Rendle in Cat. Afr. Pl. Welw. ii. 131. *Antrolepis elata*, Welw. Apont. 578.

Lower Guinea. Angola: Pungo Andongo; in marshy places, between Condo and Quisonde, not far from the River Cuanza, 3500–3800 ft., *Welwitsch*, 1670! Malange, *Mechow*, 332!

The stamens are usually 2; when 3, they are anticous as usual, not as depicted by Welwitsch.

7. **A. pusilla,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 164, *t.* 23, *fig.* 10–14. Glabrous. Stems 2–6 in. long, annual, tufted, slender. Leaves $\frac{1}{2}$ the length of the stem, setaceous. Head $\frac{1}{8}$–$\frac{1}{5}$ in. in diam., straw-coloured, of 3 (rarely 2–1) distinct densely-flowered spikelets; bracts 2–3, up to 1–3 in. long, spreading or pendent. Spikelets $\frac{1}{12}$–$\frac{1}{8}$ in. long when young; in fruit elongating, with the lower glumes and nuts caducous seriatim from the base, as in *Lipocarpha*. Glumes minute, narrow-oblong, shorter than the squamellæ. Squamella $\frac{1}{12}$–$\frac{1}{10}$ in. long, of thick loose tissue, broadly obovate, truncate; rostrum short or minute, margins enrolled round the nut, overlapping, free to the base in Barter n. 761. Nut $\frac{1}{2}$ the length of the squamella, oblong-ellipsoid, subtrigonous, smooth, dark chestnut-coloured. Style $\frac{1}{2}$ the length of the nut; branches 3, linear, short, hardly exserted above the rim of the

squamella.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 652; Rendle in Cat. Afr. Pl. Welw. ii. 131.

Upper Guinea. Niger Territory: Nupe, in rice fields, *Barter*, 761!

Lower Guinea. Angola: Huilla; in damp pastures around Lopollo and Monino, *Welwitsch*, 1678!

This plant is exceedingly like the small species of *Lipocarpha* as *L. microcephala*. The distinct 3 spikelets in the head separate it completely from the preceding species with globose or hemispheric heads. Ridley has figured the squamella as of sect. *Platylepis*, i.e. completely utricular, which is certainly not the case in Barter, 761, where the margins of the squamella are free to the base. Welwitsch 1678 (whence Ridley took his figures) must, I think, be the same species as Barter 761; but the flowers are still more minute and the margin of the squamella more difficult to see.

8. **A. capensis,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 164. Glabrous. Rhizome seen up to 2 in. long, slender, black, usually 0. Stems 8–20 in. long, densely tufted, slender. Leaves $\frac{1}{2}$–$\frac{3}{4}$ the length of the stem, $\frac{1}{12}$–$\frac{1}{8}$ in. broad. Head of 3–1 (fused or nearly distinct) spikelets, white or straw-coloured; bracts 3, spreading, similar to the leaves, from a short broad base, lowest 1–4 in. long. Spikelets $\frac{1}{3}$–$\frac{1}{2}$ in. long, ovoid, dense. Glume oblong, shorter than the squamella. Squamella flattened from front to back, shaped as a watch-pocket, the margins connate on the posticous side nearly to the top, the beak from the anticous side $\frac{1}{20}$–$\frac{1}{6}$ in. or more long, very variable, also the beaks of the marginal flowers often elongate, so that the heads are more or less rayed. Style much shorter than the nut; branches 2, scarcely exserted from the mouth of the pocket. Nut sessile, $\frac{1}{2}$–$\frac{2}{3}$ the length of the pocket, oblong-ellipsoid, compressed, smooth, black.—C. B. Clarke in Durand and Schinz, Conspect. Fl. Afr. v. 651 incl. var. β *lacera*, in Bull. Herb. Boiss. iv. Append. iii. 31, in Dyer, Fl. Cap. vii. 266, and in Trans. Linn. Soc. ser. 2, Bot. iv. 54; Engl. Hochgebirgsfl. Trop. Afr. 144; K. Schum. in Engl. Pfl. Ost-Afr. C. 127; Rendle in Cat. Afr. Pl. Welw. ii. 131. *Platylepis capensis*, Kunth, Enum. ii. 269; Boeck. in Linnæa, xxxvii. 119, and in Flora, 1879, 567.

Upper Guinea. Niger Territory: Nupe, *Barter!*

Nile Land. British East Africa: Upper Nile, *Petherick!* Jur; Jur Ghattas, *Schweinfurth*, 1467! 1505! Jur Awet, *Schweinfurth*, 1565!

Lower Guinea. Angola: Huilla; in spongy places near Lopollo and on the higher parts of Morro de Lopollo, *Welwitsch*, 1676! 1677! near Ferrao de Sola, *Welwitsch*, 1676 B! Serra d' Uiahoia, *Welwitsch*, 1677 B! Humpata and Huilla, *Johnston! Newton!* Ovamboland; *Höpfner*, 81!

Mozamb. Dist. German East Africa: Lower Plateau, north of Lake Nyasa, *Thomson!* Portuguese East Africa: Namuli Mountains, *Last!* British Central Africa: Urungu; Fwambo, *Carson*, 83! *Nutt!* Nyasaland; Shire Highlands, *Buchanan*, 27! Mount Zomba, 4000–6000 ft., *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!* Mount Mlanji, *Whyte!* between Lake Shirwa and Lake Chiuta, *Cunningham*, 4! and without precise locality, *Buchanan*, 994! 1457! Mashonaland and Matabeleland, *Bryce!*

Also in South Africa.

9. **A. brasiliensis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 651. Stems attaining 2–2½ ft. in length. Spikelets often 3–6 in the head, less fused together than in *A. capensis*, somewhat cinnamon-coloured. Ovary and nut stalked; otherwise as *A. capensis*.—*Platylepis brasiliensis*, Kunth, Enum. ii. 269; Boeck. in Linnæa, xxxvii. 119.

Upper Guinea. French Guinea: Sulimania; Erimakuna, *Scott-Elliot*, 5243! Niger Territory: Nupe, *Barter*, 1587!

Lower Guinea. Angola: Malange, *Mechow*, 346!

Also in Madagascar, and throughout South America.

This species is very close to *A. capensis*. It is separated solely by the minute stalk to the nut.

16. **RYNCHOSPORA,** Vahl; Benth. et Hook. f. Gen. Pl. iii. 1058 (*Rhynchospora*).

Spikelets of 1 or more perfect flowers. Uppermost glumes male or sterile, the 3 lowest usually empty and smaller. Hypogynous bristles as long as the nut, or shorter, or often 0. Style long, linear, either minutely bifid at the tip (Series, *Haplostyleæ*), or with two linear branches longer than the style (Series, *Diplostyleæ*); style base dilated, large or small, persistent. Nut obovoid to narrowly oblong, flattened.

Species 184, i.e. including *Psilocarya*, but excluding *Pleurostachys* (Sect., Benth. et Hook. f.), throughout the World, especially abundant in America.

This genus, from its 2-fid style, and persistent enlarged style-base, should not be mistaken for anything but *Fimbristylis*. From this, either the inflorescence or in the 1-headed species the hypogynous bristles separate it, except in the case of *R. erinacea* (which has nodes on the stem).

*Haplostyleæ.—Style very long, minutely 2-fid at the top or subentire.

Spikelets in one dense head; stem with no nodes between the head and the basal leaves.	
Head ¼–⅓ in. in diam., rusty brown	1. *R. wallichiana.*
Head 1 in. in diam., white	2. *R. erinacea.*
Globose heads several, rarely 1; stem with nodes throughout its length	3. *R. cyperoides.*
Panicle large, long-oblong, compound; corymbs compound with many spikelets	4. *R. aurea.*

**Diplostyleæ. Style linear, about as long as the nut; branches 2, linear, longer than the style.

†*Psilocarya.* Hypogynous bristles 0.	
Spikelets ovoid, ⅙ in. long, producing several nuts, white	5. *R. candida.*
Spikelets 1/20–1/12 in. long, perfecting 1 nut; panicle compound with capillary branches	6. *R. micrantha.*
Spikelets ⅕ in. long, 3–5 in each small distant corymb	7. *R. Barteri.*
††*Eu-Rynchospora.* Hypogynous bristles 6	8. *R. glauca.*

1. **R. wallichiana,** *C. B. Clarke in Hook. f. Fl. Brit. Ind.* vi. 668. Nearly glabrous. Rhizome 0, or very short, arising from lateral offsets. Stems tufted, 6–20 in. long, slender, with no nodes between the basal

leaves and the 1 head (rarely a leaf-bearing node 3–4 in. above the base is present). Leaves often overtopping the stem, almost setaceous or up to $\frac{1}{10}$ in. broad. Head $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., of many lanceolate spikelets, rusty-brown; bracts 3–8, ascending, usually overtopping the head, linear, often villous or ciliate on the margins. Spikelets $\frac{1}{8}$–$\frac{1}{4}$ in. long, of 6–7 glumes; 4 lowest glumes empty, 5th rather larger, containing a bisexual fertile flower, 6th male or empty. Hypogynous setæ usually 6, as long as the nut, stiff, scabrid, with upward-pointing barbs, sometimes 6–4, weaker hardly $\frac{1}{2}$ the length of the nut. Stamens 3, anticous; anthers crested. Style long, linear, red, at the top minutely 2-fid. Nut $\frac{1}{2}$ the length of the glume, biconvex, compressed laterally, smooth or sometimes minutely scabrous on the shoulders, dark brown; beak $\frac{1}{3}$ the length of the nut, much narrower than it, short conic, dusky straw-coloured or green.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 655. *Rhynchospora Hænkei*, Presl, Rel. Hænk. i. 199. *R. wallichiana*, Kunth, Enum. ii. 289; Benth. in Hook. Niger Fl. 555; Boeck. in Linnæa, xxxvii. 542, excl. the American examples; K. Schum. in Engl. Pfl. Ost-Afr. C. 127 (*Wallichii*). *Sphæroschœnus Wallichii*, Arn. & Nees in Nova Acta Nat. Cur. xix. Suppl. i. 97.

Upper Guinea. Liberia: Grand Bassa, *Vogel*, 105!

Lower Guinea. Corisco Island, *Mann*, 1897!

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1275!

Also in Mauritius, India, and extending to Japan, New Guinea and Queensland.

2. **R. erinacea,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 654. Minutely puberulous-scabrous. Stems 2–2½ ft. long, with strong lateral offsets at the base, and no nodes between the basal leaves (which sheath the stem 8 in. up) and the 1 head. Leaves 8–16 by $\frac{1}{5}$ in. Head 1 in. in diam., with numerous lanceolate white spikelets; bracts 3, spreading, lowest up to 8 by $\frac{1}{8}$ in., minutely pubescent or glabrate. Spikelets very young; no setæ found, possibly not yet developed. Style long, at the tip very shortly 2-fid.—Rendle in Cat. Afr. Pl. Welw. ii. 132. *Schœnus erinaceus*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 165, t. 23, fig. 5–9.

Lower Guinea. Angola: Huilla; near the stream of Monino and Mupanda, *Welwitsch*, 6788!

The style is shown erroneously by Ridley's artist with 3 linear branches. The plant in young flower appears very near a Brasilian *Rynchospora* (Burchell's 7023 in herb. Kew.), but has much longer bracts.

3. **R. cyperoides,** *Britton in Trans. New York Acad.* xi. 84. Nearly glabrous. Rhizome short, arising from basal offsets (short stolons). Stem usually 1–2 ft. long, carrying 1–25 heads in a loose irregular corymb. Leaves long, often overtopping the stem, $\frac{1}{8}$–$\frac{1}{5}$ in. broad. Heads about $\frac{1}{3}$ in. in diam., globose, white or pallid, of about 8–24 spikelets; bracts similar to the leaves. Spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. long, lanceolate or elliptic-lanceolate, perfecting 1 or 2 nuts; lowest 4 glumes empty. Hypogynous bristles 6, as long as the nut, scabrid, with upward-pointing barbs. Nut obovoid truncate, compressed, smooth,

pale brown; beak narrow-conic almost linear; style very long, at tip minutely 2-fid.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 653, and in Dyer, Fl. Cap. vii. 267; Urban, Symb. Antill. ii. 109. *Rhynchospora cyperoides*, Mart. in Denkschr. Acad. Wiss. Muench. vi. 149; Schinz in Bull. Herb. Boiss. iv. Append. iii. 33. *R. sparganioides*, Bojer, Hort. Maurit. 386. *R. polycephala*, Kunth, Enum. ii. 291; Boeck. in Linnæa, xxxvii. 552. *R. Arechavalatæ* and *R. sphærocephala*, Boeck. Cyp. Novae, i. 24. *Schœnus cyperoides*, Swartz, Prod. 19. *Mariscus pilluliferus*, G. Bert. in Rendicosti Istit. Bologna, 1853–4, 33, and in Mem. Accad. Scienz. Istit. Bologna, v. 466, t. 24, cf. Boeck. in Flora, 1861, 336.

Upper Guinea. Guinea, *Isert!* Gold Coast: Axim, ex *Guerich.*

Lower Guinea. German South-West Africa: Amboland; at Olukonda, *Schinz*, 373!

Mozamb. Dist. Mozambique, ex *Bertoloni.*

Frequent in Natal and the Mascarene Islands. Very common in America from Mexico to Montevideo.

4. **R. aurea,** *Vahl, Enum.* ii. 229. Robust, nearly glabrous; stolons 0. Stem 3–6 ft. long with nodes throughout its length. Leaves 1–2 ft. by $\frac{1}{2}$ in. Panicle often 12–16 in. long, with lower axillary distant corymbs 2–5 in. in diam. bearing frequently 100–200 spikelets; lowest bract similar to the highest leaf. Spikelets mostly in clusters of 3–10, brown, $\frac{1}{3}$ in. long, lanceolate, perfecting 1 nut. Hypogynous setæ 6, as long as the nut, scabrid, with upward-pointing barbs. Nut $\frac{1}{2}$ the length of the glume, $\frac{1}{8}$ in. long without the beak, obovoid, flattened, brown, smooth or obscurely transversely wavy, sometimes with a notch or hollow on each side; beak as long at least as the nut, narrow-conic, grooved on one side; style very long, at the tip subentire or obscurely 2-fid.—Beauv. Fl. Oware, ii. 39, t. 81, fig. 2; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 670, in Durand & Schinz, Conspect. Fl. Afr. v. 653; and in Dyer, Fl. Cap. vii. 268; Durand & Schinz, Études Fl. Congo, i. 309; Urban, Symb. Antill. ii. 110; Rendle in Cat. Afr. Pl. Welw. ii. 131. *Rhynchospora aurea*, R. Br. Prod. 230; Kunth, Enum. ii. 293; Benth. in Hook. Niger Fl. 555; Boeck. in Linnæa, xxxvii. 626, in Flora, 1879, 569, and in Engl. Gazelle Reise, Bot. 17; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 165. *R. surinamensis*, Nees in Linnæa, ix. 297; K. Schum. in Engl. Pfl. Ost-Afr. C. 127. *Scirpus corymbosus*, Linn. Amœn. Acad. iv. 303.

Upper Guinea. Senegal, Michelin! Senegambia, *Heudelot*, 343! 344! 587! Rio Nunez, *Heudelot*, 687! Sierra Leone: Regent, *Scott-Elliot*, 3861! *Vogel*, 129! Liberia: Monrovia, *Naumann!* Lagos: Abbeokuta; *Irving!* Oware, *Beauvois!* Old Calabar; *Robb!* Cameroons: banks of the river, *Mann*, 776!

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth* 1360!

Lower Guinea. Lower Congo: Stanley Pool, 900 ft., *Hens*, B, 44! Kisantu, *Gillet*, 504! 356! *Smith!* Angola: Pungo Andongo; and without precise locality, marshes at Quisonde on the River Cuanza, *Welwitsch*, 6844! marshes of Lagoa de Quibinda, *Welwitsch*, 6845!

South Central. Congo Free State: Monbuttu; Munza, *Schweinfurth*, 3495! and without precise locality, *Demeuse*, 134!

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1232!

Throughout the warmer regions of both hemispheres.

5. **R. candida,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 653. Nearly glabrous. Stolons slender, clothed by ovate-lanceolate striate dusky-straw-coloured scales, hardening into creeping rhizomes Stems 8–20 in. long, rather slender with distant nodes throughout their length. Leaves often nearly as long as the stem, $\frac{1}{12}$–$\frac{1}{6}$ in. broad. Corymb terminal, lax, of 1–16 spikelets, somewhat level-topped, with a smaller remote axillary corymb sometimes added; pedicels rather rigid, with one spikelet. Spikelets $\frac{1}{4}$ in. long, ovoid, very white, with many (or 3 at least) nut-bearing flowers. Glumes numerous, ovate, obtuse, densely imbricate in many spirals, deciduous seriatim from the lowest (empty included), outer concave nerveless, inner somewhat keeled. Hypogynous bristles 0. Style linear, longer than the nut; branches 2, linear, longer than the style. Nut very small, about $\frac{1}{4}$ the length of the glume, biconvex, round, sessile, yellow-brown, transversely wavy; style-base large, saddle-shaped, as broad as the nut, persistent.—Rendle in Cat. Afr. Pl. Welw. ii. 132. *R. adscendens*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 652. *Psilocarya candida*, Nees in Mart. Fl. Bras. ii. i. 117. *Rhynchospora candida*, Boeck. in Linnæa, xxxvii. 605; K. Schum. in Engl. Pfl. Ost-Afr. C. 127. *Dichromena candida*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 149. *Pachymitra candida*, Nees ex Boeck. l. c. 606.

Upper Guinea. Lagos, *Barter*, 20178! Old Calabar, *Robb!*

Lower Guinea. Lower Congo: Kisuntu *Gillet*, 522! Kimuenza, *Gillet*, 1772! Angola: Huilla; damp places near Monino, *Welwitsch*, 6840!

Mozamb. Dist. German East Africa: between Lake Tanganyika and Lake Rukwa, 6000 ft., *Nutt!* British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 5!

Also in Madagascar, Guiana and Brazil.

6. **R. micrantha,** *Vahl, Enum.* ii. 231 *partly.* Glabrous, slender. Roots fibrous. Stems tufted, 4–16 in. long, with distant nodes throughout their length. Leaves 4–8 by $\frac{1}{12}$–$\frac{1}{8}$ in. Panicle oblong, usually compound, with divaricate capillary branches and pedicels. Spikelets $\frac{1}{20}$–$\frac{1}{12}$ in. long, ovoid, each perfecting 1 nut. Hypogynous bristles 0. Style as long as the nut; branches 2, linear, longer than the style. Nut $\frac{1}{30}$ in. long, sessile, obovoid, flattened, yellow-brown, with 4–5 strong transverse wrinkles; style-base saddle-shaped, as broad as the nut, much depressed.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 654; Urban, Symb. Antill. ii. 117. *Rhynchospora micrantha*, Roem. & Schultes, Syst. Veg. ii. 84 partly, not of Mant. 45; Boeck. in Linnæa, xxxvii. 608. *Zosterospermum gracile*, Desv. in Hamilt. Prod. Ind. Occid. 14; Kunth, Enum. ii. 536. *Psilocarya Teneriffæ*, Torrey in Ann. Lyceum New York, iii. 362 in note. *Dichromena micrantha*, Kunth,

Enum. ii. 278. *Scleria pygmæa*, Nees in Flora, 1828, 332, not of Spreng.

Upper Guinea. *Isert !*

Also in Teneriffe and Tropical America.

7. **R. Barteri,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 653. Glabrous. Roots fibrous. Stems 8 in. long, very slender, with nodes and leaves (or bracts) throughout their length. Leaves 4–6 by $\frac{1}{12}$ in. Corymbs about 3, distant, of 3–5 small pallid spikelets, $\frac{1}{5}$–$\frac{1}{2}$ in. in diam. Spikelets $\frac{1}{5}$ in. long, ovoid-lanceolate, each perfecting 1–2 nuts. Glumes ovate, the 3 lowest empty and minutely mucronate. Style longer than the nut; branches 2, slender, longer than the style. Nut broadly ovoid, biconvex, hardly $\frac{1}{2}$ the length of the glume, nearly sessile, smooth, brown; style-base depressed conic, much narrower than the nut.

Upper Guinea. Niger Territory : Nupe, *Barter*, 1010 !

This species differs little from *R. divergens*, Britton, which, with several closely allied species, is plentiful in the South United States and West Indies; but I have not been able to match *R. Barteri* with any American plant.

8. **R. glauca,** *Vahl, Enum.* ii. 233. Glabrous. Rhizome very short, horizontal. Stems 1–2½ ft. long, rather slender, with nodes and leaves (or bracts) throughout its length. Leaves 8–12 by $\frac{1}{8}$ in. Panicle compound, oblong (sometimes reduced to a quasi-terminal contracted corymb), often 8 by 2 in., with distant lower peduncles carrying 20–40 spikelets each; peduncles and pedicels suberect. Spikelets $\frac{1}{8}$–$\frac{1}{5}$ in. long, ovoid, subacute, chestnut-brown, each perfecting 1 or 2 nuts. Hypogynous bristles 6, about as long as the nut, brown, with upward-pointing teeth. Style about as long as the nut; branches 2, longer than the style. Nut $\frac{1}{2}$–$\frac{2}{3}$ the length of the glume, broadly-ellipsoid, biconvex, chestnut-brown, obscurely transversely wrinkled by wavy lines; style-base $\frac{1}{3}$ the length of the nut, depressed conic.—C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 671, in Durand & Schinz, Conspect. Fl. Afr. v. 654, and in Dyer, Fl. Cap. vii. 268; Urban, Symb. Antill. ii. 128. *Rhynchospora glauca*, Roem. & Schultes, Syst. Veg. ii. 85; Kunth, Enum. ii. 297 excl. several synonyms; Boeck. in Linnæa, xxxvii. 585. *R. laxa*, R. Br. Prod. 230; Kuntb, Enum. ii. 298; Coss. & Durieu, Expl. Scient. Algér. Glum. 239.

Mozamb. Dist. British Central Africa : Nyasaland; Mount Zomba, 4000–6000 ft., *Whyte !*

Common in nearly all tropical and warm temperate regions, except Tropical Africa.

Imperfectly known species.

9. **R. senegalensis,** *Steud. Syn. Pl. Glum.* ii. 149 *sub Rhynchospora*. Stem above 1 ft. long, triquetrous, smooth, bearing leaves. Leaves shorter than the internode, narrowly lanceolate, 1–2 by $\frac{1}{8}$ in., smooth. Corymb terminal, 1 or 2 axillary corymbs sometimes added.

Spikes clustered, many-flowered. Involucre of one leaf, as long as the corymb. Glumes ovate, acuminate, adpressedly puberulous. Hypogynous bristles 3–6, as long as the nut. Nut (immature) acutely triquetrous, smooth, whitish.

Upper Guinea. Senegambia, *Leprieur* (ex *Steudel*).

If the nut is really triquetrous, the plant is not a ***Rynchospora***.

17. **CARPHA,** R. Br.; Benth. et Hook. f. Gen. Pl. iii. 1061 (incl. *ASTEROCHÆTE*, Nees, Benth. et Hook. f., l. c. 1062).

Spikelets with 5–7 glumes, each perfecting 1–3 nuts. Glumes subdistichous; 3 lowest empty, fourth containing a bisexual nut-bearing flower, fifth inserted close above the fourth, uppermost sterile. Hypogynous bristles 6 or 3, long. Style linear, long, with 3 linear branches, at the base continuous with the nut, persistent. Nut oblong or oblong-ellipsoid, trigonous, at the top pyramidal.—Leaves evolute. Inflorescence paniculate, not umbelled.

Species 12, in the Southern Hemisphere, America, Africa and Australia.

This genus differs from *Schœnus* only by the lowest nut-bearing glume having the next glume close over it, not separated by an elongate curved joint of the rhachilla as is the case in *Schœnus*.

1. **C. Emini,** *C. B. Clarke.* Glabrous. Rhizome short, rather slender. Stems 1–2 ft. long. Leaves up to $\frac{2}{3}$ the length of the stem, $\frac{1}{12}$ in. broad. Panicle 6–12 in. long; lower peduncles axillary carrying oblong panicles of many brown spikelets close together. Spikelets $\frac{1}{3}$ in. long, of 5 glumes. Glumes oblong, hardly acute, the 3 lowest empty, the fourth containing a bisexual perfect flower, the fifth smaller and sterile. Hypogynous bristles 6, scabrid with upward-pointing barbs, the 3 inner (petals) as long as the nut, the 3 outer (sepals) twice as long. Stamens 3, anticous. Nut small, $\frac{1}{3}$ the length of the glume, hardly at all scabrid, obscurely reticulated.—*Oreograstis Emini*, K. Schum. in Engl. Pfl. Ost-Afr. C. 127.

Nile Land. British East Africa: Ruwenzori, 10,000 ft., *Stuhlmann,* 2439!

This, as above interpreted, differs little from *C. Aubertii*, Nees, a Bourbon plant; but the description (of the same material) by Dr. K. Schumann differs considerably.

18. **SCHŒNUS,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 1062.

Spikelets perfecting 1 or few nuts. Glumes subdistichous; 3 lowest empty, fourth containing a bisexual nut-bearing flower, the rhachilla elongated and curved before the insertion of the fifth glume: uppermost glumes reduced. Hypogynous bristles various or 0. Style linear, long, with 3 linear branches. Nut small, obovoid, trigonous, at the top truncate or pyramidal.—Inflorescence panicled, corymbose or subcapitate, not umbellate.

Species, besides the one here described, 58, whereof 1 is European, 1 North

American; the remaining 56 being an Australian group whereof a very few extend to South-east Asia or South America.

1. **S. nigricans,** *Linn. Sp. Pl. ed.* ii. 64. Glabrous. Stolons 0. Stems 6–20 in. long, stoutly tufted, with no nodes between the basal leaves and the 1 head. Leaves about $\frac{1}{2}$ the length of the stem, $\frac{1}{16}$–$\frac{1}{12}$ in. broad. Head $\frac{1}{2}$ in. in diam., of 1–15 spikelets; bracts 2, suberect, lower 1–4 in. long, linear, but dilated at the base. Spikelet $\frac{1}{3}$ in. long, maturing 1–3 nuts. Glumes ovate, obtuse, minutely scabrid on the keel. Stamens 3, anticous. Hypogynous bristles 3–5, less than $\frac{1}{2}$ the length of the nut, yellow-brown, scabrid with upward-pointing barbs. Nut in the hollow of the curved joint of the rhachilla, $\frac{1}{3}$ the length of the glume, ellipsoid, trigonous, smooth, pallid, without beak; style deciduous.—Sowerby, Engl. Bot. t. 1121; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 673, in Durand & Schinz, Conspect. Fl. Afr. v. 657, and in Dyer, Fl. Cap. vii. 272; Coss. & Durieu, Expl. Scient. Algér. Glum. 241; J. Ball in Journ. Linn. Soc. xvi. 702. *Chætospora nigricans,* Kunth, Enum. ii. 323; Boeck. in Linnæa, xxxviii. 290.

Nile Land. Abyssinia, *Schimper,* 173! Somaliland, *Miss Edith Cole!*

Extending from Western Europe to North-west India, also in North and South Africa, the United States, and Surinam.

19. **CLADIUM,** P. Browne; Benth. et Hook. f. Gen. Pl. iii. 1065.

Spikelets perfecting 1–3 (rarely more) nuts. Glumes imbricated on all sides, 3–4 lowest empty, next containing a bisexual flower perfecting a nut, uppermost reduced; rhachilla not elongated above the lowest fertile glume. Hypogynous bristles 0 (or rarely small). Style linear; branches 3, long; base thickened. Nut small, trigonous, crowned by the enlarged style-base and continuous with it, not distinguishable by a transverse constriction or line.—Mostly robust plants, of varied habit. Inflorescence usually a long panicle, sometimes shortly corymbose, never umbellate.

Species, besides the one Cosmopolitan here described, 44; mostly insular or near the sea, scattered throughout the warmer parts of the globe.

1. **C. jamaicense,** *Crantz, Inst.* i. 362. Glabrous. Stolons long, stout, clothed with striate pale brown ovate-lanceolate scales 1 in. long. Stem 3–8 ft. high, roundish, with nodes and leaves (or bracts) throughout its length. Leaves 2–3 ft. by $\frac{1}{5}$–$\frac{1}{3}$ in., scabrous on the margins. Panicle oblong, often 1–2 ft. by 3–6 in.; lowest bract similar to the topmost leaf; lowest peduncle bearing a compound corymb often of 100–200 spikelets. Spikelets $\frac{1}{12}$–$\frac{1}{6}$ in. long, when mature ellipsoid or ovoid, obtuse, pale brown, in clusters of 3–10 or solitary, with 2–1 flowers, the lower bisexual producing a nut. Glumes ovate, obtuse, concave. Hypogynous bristles 0. Stamens 2. Style-base large, obovoid-subpyramidal, confluent with the top of the ovary. Nut $\frac{1}{16}$ in.

long, obovoid, the cavity continued up the style-base.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 665; Urban, Symb. Antill. ii. 134. *C. germanicum*, Schrad. Fl. Germ. i. 75, t. 5, fig. 7. *C. Mariscus*, R. Br. Prod. 236; Kunth, Enum. ii. 303; Boeck. in Linnæa, xxxviii. 232; Coss. & Durieu, Expl. Scient. Algér. Glum. 240; Balfour in Trans. Roy. Soc. Edin. xxxi. 308; Dyer, Fl. Cap. vii. 291. *Schœnus Mariscus*, Linn. Sp. Pl. ed. ii. 62; Sowerby, Engl. Bot. t. 950.

Upper Guinea. Cape Verd Isles, *Vogel*, 26! *Bolle*.

Lower Guinea. Angola: Malange, *Mechow*, 321! *Buchner*, 152!

Scattered through nearly all warm and warm-temperate regions.

20. **TETRARIA**, Beauv. in Mém. Inst. Franç. 1812 (1816) ii. 53–57.

Spikelets 2-flowered, the lower flower male or with an imperfect pistil not maturing a nut, the upper perfect fertile. Glumes subdistichous, 5–12; the lowest 3–6 empty, the uppermost reduced. Hypogynous bristles various, or 0. Style linear, branches 3 (or 4) or 6 (or 8), long; base dilated, continuous. Nut small, obovoid, 3- (or 4-) gonous, crowned or almost beaked by the style.—Plants of varied habit. Inflorescence usually a narrow panicle, sometimes reduced nearly to a head, never umbellate.—*Elynanthus*, Benth. et Hook. f. Gen. Pl. iii. 1063, not of Beauv.

Species 32, endemic in South Africa, one species also in Usambara.

1. **T. circinalis,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 659. Glabrous. Rhizome slender, horizontal. Stems tufted 3–10 in. long, with nodes (bearing leaves or bracts) throughout their length. Leaves often as long as the stem, $\frac{1}{16}$–$\frac{1}{8}$ in. broad; basal-sheaths brown or reddish, often fimbriate. Panicle 2–6 by $\frac{1}{2}$–$1\frac{1}{2}$ in., with 15–60 spikelets, often rather dense. Spikelets $\frac{1}{3}$ by $\frac{1}{8}$ in., cylindric, brown. Lower empty glumes 6, hardly acute. Hypogynous bristles 3–4, shorter than the nut, scabrous. Stamens 3; anthers linear-oblong, crested. Style 3-branched. Nut (not seen ripe) small, obovoid, trigonous; style-base depressed-hemispheric, confluent with the top of the ovary, minutely scabrous.—C. B. Clarke in Dyer, Fl. Cap. vii. 283. *T. usambarensis*, K. Schum. in Engl. Pfl. Ost-Afr. v. 128. *Schœnus circinalis*, Schrad. in Roem. & Schultes, Syst. Veg. ii. Mant. 43. *Chætospora circinalis*, Schrad. Anal. Fl. Cap. 31, t. 3, fig. 2; Kunth, Enum. ii. 324.

Mozamb. Dist. German East Africa: Usambara, *Holst*, 131!

Also in South Africa.

21. **REMIREA**, Aubl.; Benth. et Hook. f. Gen. Pl. iii. 1058.

Spikelets 1-flowered, densely spicate on digitate spikes. Glumes 4 to the spikelet, imbricated on all sides, the perfect flower pseudo-

terminal in the top glume. Hypogynous bristles 0. Stamens 3, unilateral; anthers crested. Style linear; branches 3, long; base gradually continuous into the top of the ovary. Nut ellipsoid or linear-oblong, trigonous, sessile, smooth, often curved.

Species 1, widely distributed.

The position of the stamens, the curvature of the nut, as well as the fine drawings prepared for Sir William Hooker, show that the flower is here really lateral; the inflorescence may be compared with that of *Gahnia*.

1. **R. maritima,** *Aubl. Pl. Guian.* i. 45, *t.* 16. Glabrous. Rhizome $\frac{1}{12}$–$\frac{1}{8}$ in. in diam., creeping, seen 20 in. long. Stems distant, or tufted near the tip of the rhizome, $\frac{1}{2}$–4 in. long, without nodes between the basal leaves and the inflorescence, but usually clothed with leaf-sheaths nearly their whole length, or the inflorescence in the short-stemmed examples seems sunk among the leaves. Leaves 1–$3\frac{1}{2}$ in. long, dense, rigid, tapering from a base often $\frac{1}{5}$ in. wide or more. Bracts 2–6, up to 1–2 in. long, similar to the leaves. Spikes 3–7 to the head, sessile, $\frac{1}{2}$–$\frac{2}{3}$ in. long, with about 30 spikelets, ovoid, dense, straw-coloured or dusky. Spikelets $\frac{1}{8}$–$\frac{1}{5}$ in. long, ellipsoid. Glumes ovate, triangular at the tip, the 3 lower empty and much inrolled. Nut $\frac{2}{3}$ the length of the glume, chestnut-coloured.—Beauv. Fl. Owar. ii. 23, t. 73; Schumach. Beskr. Guin. Pl. 43; Kunth, Enum. ii. 139; Benth. in Hook. Niger Fl. 552; Boeck. in Linnæa, xxxv. 435; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 165; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 677, and in Durand & Schinz, Conspect. Fl. Afr. v. 665; Urban, Symb. Antill. ii. 136; Rendle in Cat. Afr. Pl. Welw. ii. 132. *R. pedunculata*, R. Br. Prod. 236; Kunth. Enum. ii. 139.

Upper Guinea. Guinea, *Thonning*, 377! *Smeathmann! Jardin!* Sierra Leone, *Don!* Niger Delta: River Nun, *Mann*, 534!

Lower Guinea. Angola: Congo; on the sea-shore not far from the mouth of the River Onco or Onzo, *Welwitsch*, 6990!

Widely distributed in the tropics.

22. HYPOLYTRUM, L. C. Rich.; Benth. et Hook. f. Gen. Pl. iii. 1054.

Spikelets numerous, in dense oblong or globose spikes, small, of 2 or 3 glumes and 3 flowers. Two lowest glumes opposite (or nearly so), not rarely more or less connate at the base, boat-shaped or keeled, usually hairy on the keel, oblong or elliptic, each containing one stamen and regarded here as a male flower; third glume lateral or oblique, smaller, empty, or in the African species usually 0; female flower terminal on the axis of the spikelet without any glume. Style much enlarged at the base; branches 2, long. Nut small, obovoid, flattened; the large style-base usually neatly fused with it.—Spikes corymbose.

Species 39, in the Tropical regions of both hemispheres.

*Foliigeræ. Stem with 1 or 2 nodes far above the base that bear long leaves Lowest bract overtopping the inflorescence.

Leaves linear, caudate; stems 15–30 in. long, with
50–150 spikes . . . . . 1. *H. nemorum.*

Leaves triangular at the tip; stems 4–10 in. long, with 15–25 spikes . . . . . 2. *H. congense.*
Leaves lanceolate, caudate; stems 3–5 ft. long, with 35 spikes . . . . . 3. *H. lancifolium.*

**Scaposæ. Basal leaves long. Stem scapose, with no node or rarely 1 near the top: stem-leaf (if present) and bracts very short.

Spikes $\frac{1}{3}$ in. long, oblong or oblong-ellipsoid . 4. *H. africanum.*
Spikes $\frac{1}{5}$–$\frac{1}{4}$ in. long, globose in fruit.
Scape 8–12 in. long, slender, with 8–16 spikes . . . . . 5. *H. senegalense.*
Scape 20–28 in. long, stout, with 40–100 spikes . . . . . 6. *H. longiscaposum.*

1. **H. nemorum,** *Spreng. Syst.* i. 233, *excl. synonyms and some of the habitats.* Nearly glabrous. Stolons stout, clothed by broad-ovate striate brown scales $\frac{1}{2}$ in. long, hardening into rhizomes $\frac{1}{10}$ in. in diam. Stem 15–30 in. high, tough, with nodes carrying long leaves, often scabrous at the top. Stem leaves 1–2 ft. by $\frac{2}{3}$–1 in., 3-nerved, very scabrid on the margin, tip acuminate-caudate. Panicle often 4–6 in. long and broad, with often 50–150 spikes; peduncles rigid, divaricate; lowest bract leaf-like, usually much exceeding the panicle. Spikes solitary or almost clustered, of 10–20 spikelets, in flower $\frac{1}{4}$ in. long and narrow-cylindric, in fruit $\frac{1}{5}$ in. long and globose. Bract to the spikelet $\frac{1}{10}$ in. long, broadly orbicular. Glumes to the two lowest male flowers oblong, keeled, nearly as long as the bract. Sterile flower (between the male flowers and nut) 0. Style 2-fid. Nut scarcely longer than the male glumes, obovoid, flattened, smooth, dusky-brown, apparently beakless, i.e. the style-base entirely fused into the nut.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 666; K. Schum. in Engl. Pfl. Ost-Afr. C. 127. *H. latifolium,* Benth. in Hook. Niger Fl. 555; Boeck. in Linnæa, xxxvii. 129; vix L. C. Rich. *H. heterophyllum,* and *H. buchholzianum,* Boeck. Cyp. Novæ, i. 22. *Hypœlyptum nemorum,* Beauv. Fl. Owar. ii. 13, t. 67, not *Schœnus nemorum,* Vahl. *Hypelytrum nemorum,* Dietr. Sp. Pl. ii. 364 partly.

Upper Guinea. Senegambia, *Heudelot,* 64! Sierra Leone, *Smeathmann! Afzelius! Scott-Elliot,* 4575! Lagos, *Millen,* 193! Lower Niger: Abo, *Buchholz!* Cameroons: Rio del Rey, *Johnston!* Mungo; *Buchholz!* by the Lobe River, near Batanga, *Bates,* 149! Fernando Po, *Vogel,* 206! *Mann,* 120!

Lower Guinea. Spanish Gaboon: Mount John, Kongue River, *Mann,* 1894! Lower Congo: Stanley Pool, *Luja,* 31! *Duchesne,* 27! Kisantu, *Gillet,* 1792!

South Central. Congo Free State, *Dewevre,* 288!

Mozamb. Dist. German East Africa: Usambara; at Nquelo, *Holst,* 2288!

2. **H. congense,** *C. B. Clarke.* Stolons densely covered by ovate scales. Stems 4–10 in. long, carrying 2 leaves far above the base, smooth, in Dewevre 746 glabrous, in Dewevre 1061 bis hairy. Basal leaves overtopping the stem, $\frac{1}{2}$ in. broad, the tip narrow-triangular; stem-leaves similar but smaller, overtopping the inflorescence, not caudate and scarcely acuminate at the tip. Corymb $\frac{1}{8}$–$\frac{1}{5}$ in. in diam.,

with 15–25 spikes; rhachis hairy or scabrid; bracts 2 by $\frac{2}{5}$ in., narrowly lanceolate, not caudate. Spikes in flower $\frac{1}{8}$ in. long, ellipsoid, brown.

South Central. Congo Free State, *Dewevre*, 746! 1061 bis!

3. **H. lancifolium,** *C. B. Clarke.* Nearly glabrous. Stolons clothed with elliptic brown scales, hardening into rhizomes. Stem 3–5 ft. long, rather slender, with nodes (bearing long leaves) throughout its length. Stem-leaves 10 by $1\frac{1}{4}$ in., caudate-acuminate, 3-nerved, at the base as though petioled. Corymb 3 in. in diam., of 35 spikes; lowest bract 8 in. long, like the leaves. Spikes in fruit $\frac{1}{3}$ by $\frac{1}{5}$ in., ovoid-lanceolate, brown, of 20 spikelets. Bract to spikelet $\frac{1}{10}$–$\frac{1}{8}$ in. long, hardly acute. Glumes to the two lowest male flowers oblong, keeled, nearly as long as the bract. Sterile flower 0. Style 2-fid. Nut ellipsoid-lanceolate, flattened, brown, much longer than the bract, 7-nerved in the lower half, the upper half being the style-base confluent with the nut.

Upper Guinea. Cameroons: Efulen, *Bates*, 308!

4. **H. africanum,** *Nees in Linnæa*, ix. 288 *name only.* Nearly glabrous. Stolons 0. Stem-base woody, obliquely descending, densely clothed with smooth roots $\frac{1}{12}$ in. in diam., apparently standing in water. Basal leaves numerous, 16–30 by $\frac{1}{2}$ in., 3-nerved. Stems (scapes) from the axils of the crowded leaves, 1–2 ft. long, leafless, rarely with a node (carrying a small leaf) near the top. Panicle corymbose, varying from 1 in. in diam. with 8 spikes to $4\frac{1}{2}$ in. in diam. with 80 spikes, sometimes proliferous; lowest bract rarely so long as the inflorescence, linear with a dilated base (not like the leaves). Spikes $\frac{1}{3}$ in. long, in flower narrow-cylindric, in fruit ellipsoid, brown. Bract to the spikelet $\frac{1}{12}$ in. long, elliptic, obtuse. Glumes to the two lowest male flowers hardly shorter than the bract, boat-shaped, distinct. Sterile flower-glume 0. Nut obovoid, flattened, longitudinally ribbed, crowned by a smooth ovoid beak (style-base) shorter than the nut; but there are many small infertile nuts in which the beak is much larger than the nut (as is seen in several of the Indian polygamo-dicœcious species).—Steud. Syn. Pl. Glum. ii. 132; Boeck. in Linnæa, xxxvii. 125; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. iii. 666; Durand & Schinz, Études Fl. Congo, i, 309. *H. nemorum*, Henriques in Bolet. Soc. Brot. v. 209, not of Spreng. *Hypolytri* sp. africana, Benth. et Hook. f. Gen. Pl. iii. 1055.

Upper Guinea. Sierra Leone: Sangasanga, *Scott-Elliot*, 4415! Makonde, *Scott-Elliot*, 5686! and without precise locality, *Smeathmann! Afzelius! Don!* French Guinea: Sulimania; near Erimakuna, *Scott-Elliot*, 5396! Niger Territory: Onitsa, *Barter*, 1575! Cameroons: Bipinde, *Zenker*, 2052! by the River Lobe at Batanga, *Bates*, 148!

Lower Guinea. Island of St. Thomas, *Quintas*, 12! and *Fl. Afr. Exsicc. Conimbric.*, 127! Lower Congo: Kisantu, *Gillet*, 1075! and without precise locality, *Smith!*

South Central. Congo Free State, *Demeuse*, 412!

5. **H. senegalense,** *C. B. Clarke.* Glabrous. Rhizome horizontal, woody, $\frac{1}{20}$ in. in diam. Leaves all radical, 8–16 by $\frac{1}{3}$ in., 3-nerved.

Stem (i.e. scape) axillary, 8–12 in. long, slender, without any nodes, minutely scabrid at the top. Corymb 1–2 in. in diam., of 8–16 spikes; lowest bract hardly $\frac{1}{2}$ in. long, linear. Spikes $\frac{1}{4}$ in. long, ovoid or subglobose. Bract to the spikelet obovate, obtuse, scarious-white. Glumes to the 2 male flowers as long as the bract, keeled, subconnate at the base on the anticous side of the spike, free and standing apart on the posticous side; glumes to the sterile flower smaller on the posticous side of the nut. Style 2-fid. Nut obovoid, flattened, with 8–9 longitudinal ribs, crowned by the ovoid smooth beak (style-base) overtopping the bract.

Upper Guinea. Senegambia: *Rio Nunez, Heudelot*, 747!

6. **H. longiscaposum,** *C. B. Clarke.* Rhizome horizontal, $\frac{1}{8}$ in. in diam. Leaves all basal, up to 20–30 by $\frac{3}{4}$ in., 3-nerved. Stem (i.e. scape) lateral, 20–28 in. long, stout, trigonous, without nodes. Corymb 4–6 in. in diam., depressed, subumbellate from the numerous approximate branches springing horizontally, of 40–100 spikes; lowest bract 1–2 in. long, not leaf-like, lanceolate-linear, somewhat coloured. Spikes $\frac{1}{5}$–$\frac{1}{4}$ in. long, in flower ellipsoid, in fruit globose, bright brown. Bract to the spikelet $\frac{1}{12}$ in. long, ovate, obtuse. Glumes to the 2 lowest male flowers $\frac{1}{12}$ in. long, keeled, distinct. Nut obovoid, flattened, smooth; the beak spongy, straw-coloured, obovoid, broader than the nut, exserted above the bract.

Upper Guinea. Sierra Leone: near Regent, *Scott-Elliot*, 4014! by streams in Talla Hill Plateau, north of Kundita, 3500 ft., *Scott-Elliot*, 5050!

23. **MAPANIA,** Aubl.; Benth. et Hook. f. Gen. Pl. iii. 1055.

Spikelets with several empty glumes between the 2 lowest male flowers and the terminal nut. Style 3-fid or 2-fid.—Spikes sessile in 1 head on the scapes; otherwise as *Hypolytrum*.

Species 28, throughout the Tropics.

In this genus, the presence of several empty glumes between the 2 lowest male flowers and the terminal female flower (a pistil only) renders it impossible to explain the spikelet as a single axillary flower. The interpretation of the spikelet of *Hypolytrum* must be the same as that of *Mapania*. Cf. Goebel in Ann. Jard. Bot. Buitenz. vii. 128

Bracts small, shorter or hardly longer than the head.
- Peduncle long; spikes 40–60 in the head; style 2-fid — 1. *M. scaberrima.*
- Peduncle short; spikes 3–8 in the head; style 3-fid — 2. *M. africana.*

Bracts 3, whereof one at least is leaf-like, much longer than the head.
- Leaves tapering at the base into a quasi-petiole at least $\frac{1}{4}$ in. broad.
  - Head simple.
    - Head $\frac{2}{3}$–1 in. in diam., of 25 spikes — 3. *M. ferruginea.*
    - Head 2 in. in diam., of 100 spikes — 5. *M. superba.*
  - Head made up of 6 heads half-fused together — 4. *M. subcomposita.*

Leaves suddenly narrowed at the base into a long quasi-petiole less than $\frac{1}{6}$ in. broad.	
Lowest bract 6–10 in. long, on a quasi-petiole $\frac{1}{2}$–2 in. long	6. *M. Mannii.*
Lowest bract 1–3 in. long, on a quasi-petiole hardly $\frac{1}{4}$ in. long	7. *M. oblonga.*

1. **M. scaberrima,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 667. Glabrous. Rhizome thick, short, oblique. Basal leaves numerous, 3 ft. by $\frac{2}{3}$ in., 3-nerved, margins scabrid. Scapes axillary, 12–15 in. long, with scales only near the base, at the top scabrid. Head $\frac{3}{4}$ in. in diam., of 40–60 spikes; bracts hardly any. Spikes $\frac{1}{5}$–$\frac{1}{3}$ in. long, ellipsoid or oblong, dusky brown. Bracts to the numerous spikelets scarcely $\frac{1}{8}$ in. long, ovate, obtuse. Glumes to the 2 lowest male flowers opposite, boat-shaped, oblong, ciliate on the keel; empty glumes about 4, shorter than the male glumes. Style with 2 long branches.—*Hypolytrum scaberrimum*, Boeck. in Flora, 1882, 26.

Lower Guinea. Gaboon: Sibange Farm, *Soyaux*, 153B!

2. **M. africana,** *Boeck. in Linnæa*, xxxvii. 137. Glabrous. Roots very thick, tough. Basal leaves numerous, 3 ft. by $1\frac{1}{3}$ in., 3-nerved, quasi-petioled. Scapes numerous, axillary, 2–$3\frac{1}{2}$ in. long, slender. Head $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., of 3–8 spikes, brown; bracts ovate, hardly as long as the head. Bracts to the spikelets $\frac{1}{8}$ in. long, ovate, obtuse. Glumes to the 2 male flowers nearly as long as the bract, boat-shaped, ciliate on the keel. Sterile glumes, between the male glumes and the pistil, about 3, shorter than the male glumes. Style-branches 3, long. Nut very small, obovoid, obscurely 3-gonous, wrinkled, black.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 667.

Lower Guinea. Spanish Gaboon: Mount John on the River Kongui, *Mann*, 1873!

3. **M. ferruginea,** *Ridley in Bolet. Soc. Brot.* v. 209, *t. F, fig. B.* Glabrous, robust. Basal leaves 2–3 ft. by $\frac{1}{2}$–$1\frac{1}{4}$ in., 3-nerved, tapering at the base into a short quasi-petiole more than $\frac{1}{4}$ in. broad. Scapes 8–16 in. long, triquetrous at the top. Head $\frac{2}{3}$–1 in. in diam., of 25 spikes, a rich brown; bracts 3, the lowest up to 12 by 1 in., leaf-like, narrowed at the base into a short broad quasi-petiole. Spikes $\frac{1}{4}$–$\frac{1}{3}$ in. long, ellipsoid or broad-oblong. Bracts to the spikelets $\frac{1}{5}$ in. long, elliptic, obtuse. Two lowest male glumes boat-shaped, $\frac{2}{3}$ the length of the bract, ciliate on the keel. Empty glumes 4, nearly as long as the male glumes. Style-branches 2. Nut very small, obovoid, margined, shining black-chestnut, more or less wrinkled or almost tubercled.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 667. *Hypolytrum Soyauxii* and *H. aschersonianum*, Boeck. in Flora, 1882, 25, 26.

Upper Guinea. Cameroons: Efulen, *Bates*, 450!

Lower Guinea. Island of St. Thomas, *Mann!* Gaboon: Munda; Sibange Farm, *Soyaux*, 153C! Sierra del Crystal, *Mann!*

4. **M. subcomposita,** *C. B. Clarke.* Head $1\frac{1}{2}$ by $1\frac{3}{4}$ in., made up of 6 heads imperfectly fused together, a fine brown. Bracts to the

spikelets $\frac{1}{4}$ in. or rather more long, in fruit a fine brown colour, nearly glabrous. Nuts nearly globose, $\frac{1}{16}$ in. in diam., black, smooth; the long style with 2 short branches still persistent—otherwise nearly as *M. ferruginea.*—*M. ferruginea*, var. *subcomposita*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 667.

Lower Guinea. Island of St. Thomas, *Moller*, 9! and *Fl. Afr. Exsicc. Conimbric.*, 128!

Var. (?) *purpuriceps*, C. B. Clarke. Leaf broader up to $2\frac{1}{2}$ in. wide. Head rather looser, a purplish tinge in the dried example; bracts to the spikelets $\frac{1}{3}$ in. long, rather broader; the two glumes to the 1-staminate flowers very pubescent on the keel. Style with 2 very long branches.

Lower Guinea. Gaboon: Mfoa, *Bates*, 526!

The specimen is in young flower and without the lower stem and leaves. It is probably specifically separable from *M. subcomposita*, as the very long style-branches here present could hardly become short in fruit.

5. **M. superba,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 667. Glabrous. Stolons $\frac{1}{8}$ in. in diam., clothed by ovate obtuse scales $\frac{1}{4}$–$\frac{1}{3}$ in. long. Basal leaves 3–5 ft. by 2 in., 3-nerved, narrowed at the base into a quasi-petiole $\frac{1}{4}$ in. broad. Scape 1 ft. long, very stout, trigonous. Head up to 2 in. in diam., globose, of 100 spikes, not at all compound; bracts 3, the lowest 18 by 2 in., similar to the leaves, quasi-petioled (in G. Mann 1639 sessile, not narrowed at the base). Spikes $\frac{1}{2}$–$\frac{2}{3}$ by $\frac{1}{4}$ in., a fine brown. Bracts to the spikelets $\frac{1}{4}$ in. long, oblong, obtuse. Glumes (male and empty) nut and style as in *M. ferruginea.*—*Hypolytrum macranthum*, Boeck. in Engler Jahrb. v. 507.

Upper Guinea. Cameroons: Efulen, *Bates*, 312!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux!* Sierra del Crystal, *Mann*, 1639!

One of G. Mann's examples has the bracts sessile and truncate at the base, the other has the bracts long attenuate and quasi-petioled. These may represent two distinct species; but G. Mann has numbered both 1639.

6. **M. Mannii,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 667. Glabrous. Stolons hardening into rhizomes $\frac{1}{8}$ in. in diam. Basal leaves (lamina) 12–15 by $1\frac{1}{2}$ in., 3-nerved, on quasi-petioles 8–12 by $\frac{1}{8}$ in. Head 1–$1\frac{1}{4}$ in. in diam., of 24 spikes, pale brown; bracts 3, lowest similar to the leaves and up to 13 in. long, but the quasi-petiole only 1–2 in. long. Spikes $\frac{2}{3}$ by $\frac{1}{6}$–$\frac{1}{5}$ in., sub-cylindric. Bracts to the spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. long, lanceolate, hardly acute. Glumes to the 2 male flowers boat-shaped, about $\frac{2}{3}$ the length of the bract, ciliate at the top of the keel. Barren glumes about 3, nearly as long as the male glumes. Style 2-branched. Nut as of *M. ferruginea*, but not perfectly ripe.

Lower Guinea. Spanish Gaboon: Mount John, on the River Kongui, *Mann*, 1892! Gaboon: Mfoa, *Bates*, 529! Sierra del Crystal, *Mann*, 1642!

7. **M. oblonga,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 667. Glabrous. Rhizome descending, strong. Basal leaves

(lamina) 5–7 by 1–2 in., 3-nerved, obtuse, or very rapidly narrowed at the tip, suddenly narrowed at the base into quasi-petioles 1–4 by $\frac{1}{8}$ in. Head $\frac{2}{3}$–$1\frac{1}{3}$ in. in diam., of 10–20 spikes, pale brown; bracts 3, dilated at the base, the lowest 3 in. long, lanceolate, much narrowed just over the ovate base. Spikes $\frac{2}{5}$ in. long, ellipsoid or oblong. Bracts to the spikelets $\frac{1}{4}$ in. long, oblong or lanceolate. Glumes of the 2 lower male flowers boat-shaped, $\frac{2}{3}$ the length of the bract, ciliate at the top of the keel. Barren glumes about 3, nearly as long as the male glumes. Style 2-branched. Nut very small, obovoid, or orbicular, dusky brown, smooth or obscurely wrinkled.

Upper Guinea. Cameroons: Rio del Rey, *Johnston!* Efulen, *Bates*, 292!

Var. *elliptica*, C. B. Clarke in Durand and Schinz, Conspect. Fl. Afr. v. 667. Basal leaves (lamina) up to 3 in. broad, quasi-petiole up to 8 by $\frac{1}{6}$ in. Scape 12 in. long, stout. Head $1\frac{1}{4}$ in. in diam., obscurely subcompound. Bracts to the spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long, narrowly oblong.

Lower Guinea. Gaboon: Sierra del Crystal, *Mann*, 1641!

Imperfectly known species.

8. **M. amplivaginata,** *K. Schum. in Notisbl. Königl. Bot. Gart. Berlin*, iii. 105. Leaves with large sheaths, 8–10 by 1 in., 3-nerved; margins not scabrid; petioles 2–4 in. long. Scape 8–10 in. long. Head $\frac{3}{4}$ in. in diam., enclosed by two large keeled bracts.

Upper Guinea. Cameroons: Barombi, *Preuss*, 484.

9. **M. secans,** *K. Schum. in Notisbl. Königl. Bot. Gart. Berlin*, iii. 105. Leaves 3 ft. long by 1 in. broad, 3-nerved; margins very scabrid nearly to the leaf-base, cutting the hand. Scape 6–8 in. long. Bract solitary, tubular, obliquely truncate. Head $\frac{1}{2}$–$\frac{2}{3}$ in. in diam., of 25 spikes. Boat-shaped male glumes connate nearly to the top. Stigmas 2.

Upper Guinea. Cameroons: Lolodorf, *Staudt*, 266.

"At first sight resembles *M. africana*, Boeck."

10. **M. dolichostachya,** *K. Schum. in Notisbl. Königl. Bot. Gart. Berlin*, iii. 106. Leaves up to 2 ft. long by $1\frac{1}{2}$ in. broad, 3-nerved, spinulose on the margins and keel beneath, quasi-petiole $2\frac{1}{2}$ in. long. Scape 8 in. long. Bracts several, the longest less than $\frac{2}{3}$ in. long. Head of 5–20 yellowish spikes, each $\frac{1}{2}$–$\frac{2}{3}$ in. long. Stigmas 3.

Upper Guinea. Cameroons: Batanga, *Dinklage*, 1420; Bipinde, *Zenker*, 2104.

11. **M. Deistelii,** *K. Schum. in Notisbl. Königl. Bot. Gart. Berlin*, iii. 106. Leaves up to 3 ft. long by 2 in. broad, 3-nerved, smooth, glabrous. Scape 1 foot long, at the top $\frac{1}{3}$ in. thick. Bracts 3, the lowest as large as the leaf. Head small. Style 2-fid.

Upper Guinea. Cameroons: Buea, 4000 ft., *Deistel*, 132.

"Allied to *M. Soyauxii*, Boeck., and *M. ferruginea*, Ridley."

24. **SCLERIA,** Berg.; Benth. et Hook. f. Gen. Pl. iii. 1070.

Flowers strictly 1-sexual. Spikelets monœcious or diœcious; monœcious spikelets of 1 basal female flower, and 1 or few male flowers above; female spikelets like the monœcious, but the upper male portion reduced to 1 or 2 empty glumes (or wanting in subgenus *Acriulus*); male spikelets like the monœcious, but without the basal female flower, and often with more numerous male flowers. Glumes concave, open, i.e. the margins not connate. Hypogynous bristles 0. Stamens 3–1. Style linear, not dilated at the base; branches 3. Nut bony, ovoid, on a gynophore; apex of gynophore often dilated into a 3-lobed disc, or (in *Ophryoscleria*) forming a small cup. Stems with nodes throughout their length. Inflorescence panicled, often scattered, never umbelled.

Species 160; found in all tropical and subtropical regions, except the Mediterranean and Orient.

*Hypoporum.—Monœcious spikelets many. Hypogynous disc obsolete.

†*Hirtellæ*. Slender plants. Spikelets small, mostly clustered. Clusters sessile in a simple spike or on the branches of a panicle. Inflorescence not leafy; bracts small or setaceous.

Annuals. (Nut horizontally muricated or tubercled.)

- Panicle reduced to a nearly simple spike.
  - Spikelets thinly hairy or glabrate.
    - Clusters small; spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. long.
      - Spike linear, elongate . . . . 1. *S. pergracilis.*
      - Spike oblong, denser . . . . 2. *S. pulchella.*
    - Spikelets $\frac{1}{4}$ in. long, 6–12 in a cluster . . 5. *S. remota.*
  - Spikelets hispid, long-ciliate
    - Clusters of spikelets deflexed; bracts inconspicuous . . . . . 3. *S. melanotricha.*
    - Clusters of spikelets erect; bracts longer than the clusters . . . . . 4. *S. glomerulata.*
- Panicle branched more or less (the sessile clusters of spikelets on the branches).
  - Panicle branches developed; the clusters of spikelets distinct.
    - Spikelets hairy . . . . . 6. *S. hispidula.*
    - Spikelets glabrous . . . . . 7. *S. glabra.*
  - Panicle oblong, dense; branches very short . 8. *S. ustulata.*

Perennials with horizontal rhizome.

- Panicle reduced to a nearly simple spike, lower clusters distinct.
  - Nut smooth.
    - Clusters of spikelets pendent in fruit.
      - Basal leaves reduced to sheaths, or short . 9. *S. hirtella.*
      - Basal leaves 8–12 in. long . . . 10. *S. catophylla.*
    - Clusters of spikelets suberect in fruit.
      - Stems thickened quasi-bulbous at the base . 13. *S. Buchanani.*
      - Stems not or obscurely thickened at the base.
        - Spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long . . . . 11. *S. mechowiana.*
        - Spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. long.
          - Nearly glabrous . . . . 12. *S. meyeriana.*
          - Hairy . . . . . 14. *S. erythrorrhiza.*

Nut reticulated or tubercled.
Stems not dilated at the base.
Spikelets 1–4 in lax clusters, suberect . . 15. *S. dregeana.*
Spikelets 8–12 in dense clusters . . . 15. *S. schweinfurthiana.*
Stems dilated at the base into ovoid bulbs . . 17. *S. bulbifera.*
Panicle manifestly compound.
Nut smooth.
Spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. long . . . . . 18. *S. Rehmanni.*
Spikelets $\frac{1}{4}$ in. long . . . . . 19. *S. Welwitschii.*
Nut reticulated or tubercled.
Spikelets mostly in clusters of 3–5 . . . 20. *S. Woodii.*
Spikelets many, solitary, some paired.
Panicle lax; branches capillary . . . 21. *S. multispiculata.*
Panicle dense; branches setaceous . . 22. *S. poæoides.*

††*Lithospermeæ.* Less slender. Inflorescence very scattered; bracts leaf-like.
Perennial . . . . . 23. *S. lithosperma.*

**SCLERIA.—Monœcious spikelets none or very few. Hypogynous disc generally conspicuous.—Mostly stouter plants than those of the subgenus *Hypoporum*. Bracts similar to the leaves.

†*Tessellatæ.* Rhizome 0 or hardly any. (All the species, except *S. gracillima*, very much alike.)
Nut tessellated.
Lowest axillary peduncle remote, much exserted, capillary, flexuose
Nut $\frac{1}{8}$–$\frac{1}{6}$ in. long. Spikes undivided, of few spikelets . . . . . 24. *S. clathrata.*
Nut $\frac{1}{10}$ in. long. Peduncles often divided, with many spikelets . . . . . 28. *S. nyasensis.*
Lowest axillary peduncle remote, scarcely exserted, straight.
Stem smooth or very nearly so. Nut large.
Nut ovoid . . . . . 25. *S. foliosa.*
Nut cylindric-ellipsoid . . . . . 26. *S. glandiformis.*
Nut globose . . . . . 27. *S. globonux.*
Stem minutely retrorse scabrous. Nut smaller . 29. *S. complanata.*
Nut smooth.
Stems medium-sized, not very slender.
Nut broader than long, depressed globose . . 30. *S. schimperiana.*
Nut longer than broad.
Disc with ovate minutely caudate lobes . . 31. *S. canaliculato-triquetra.*
Disc truncate, lobes hardly any . . . 32. *S. Hildebrandtii.*
Stems, as the leaves and inflorescence, most slender 33. *S. gracillima.*

††Rhizome thick, creeping. All stout plants, with copious inflorescence.
Stems erect.
Nut smooth.
Very stout, 3–6 ft. high, with large terminal dense panicle . . . . . 34. *S. oryzoides.*
Partial axillary remote panicles present.
Partial panicles linear or linear-oblong dense . 35. *S. melanomphala.*
Partial panicles pyramidal, open . . . 37. *S. ovuligera.*
Nut with 40 longitudinal striations . . . 36. *S. spicæformis.*
Stem rambling, 15 or 20 feet long often . . . 38. *S. Barteri.*

***OPHRYOSCLERIA.—Monœcious spikelets none. Lobes of the disc forming a cup holding the base of the nut; margin of disc ciliate. Stout plants. Leaves (and lower bracts) unequally præmorse on the sides near the top.

Nut smooth.	
Nut large; margin of disc densely ciliate . .	39. *S. racemosa.*
Nut medium-sized; margin of disc slightly ciliate .	40. *S. Vogelii.*
Nut verrucose, often tubercled	41. *S. verrucosa.*

****ACRIULUS.—Female spikelets with no male rudiments, so that the female flower appears terminal. Hypogynous disc merely the stalk of the nut. Rather stout plants, with copious panicles . . . . . 42. *S. griegifolia.*

1. **S. pergracilis,** *Kunth, Enum.* ii. 354. Glabrous, or nearly so, annual. Stems tufted, 1–2 ft. long, very slender. Leaves 4–12 by $\frac{1}{20}$–$\frac{1}{12}$ in. Spikelets (many 2-sexual) in clusters of 2–5, $\frac{1}{8}$–$\frac{1}{6}$ in. long, sessile on a subsimple spike 2 to 6 in. long; bracts to the clusters ovate, acute, and rarely longer than the clusters. Monœcious spikelet of about 7 glumes; the 2 lowest empty, the third $\frac{1}{8}$–$\frac{1}{6}$ in. long, elliptic-oblong, not acute, dark-brown, carrying the nut; the upper glumes male or empty. There also occur many male spikelets, similar to the monœcious, except that they are without the 3rd. nut-bearing glume. Stamens 1–3; anthers crested. Nut $\frac{1}{20}$ in. in diam., obovoid, trigonous, white, verrucose or muricate. Style linear, not dilated at the base. caducous; branches 3. Pores on the stalk of the nut very obscure.—Boeck. in Linnæa, xxxviii. 438, and in Flora, 1879, 569; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 685, and in Durand & Schinz, Conspect. Fl. Afr. v. 673. *Hypoporum pergracile,* Nees in Edinb. New Phil. Journ. xvii. (1834) 267, and in Wight, Contrib. 118.

Upper Guinea. Upper Senegal, *Lécard,* 289! Sierra Leone, *Afzelius!* Niger Territory: Nupe, in swamps, *Barter,* 1006!

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth,* 2472!

Also in India.

2. **S. pulchella,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 168. A glabrous, slender annual. Stems 3–8 in. long, setaceous. Leaves as long as the stem (or half as long) setaceous. Inflorescence $\frac{1}{2}$–1 by $\frac{1}{4}$–$\frac{1}{3}$ in., denser than in *S. peryracilis,* and more or less branched, sub-panicled. Spikelets nearly $\frac{1}{6}$ in. long, chestnut-brown, 3–8 on one branch of the inflorescence. Nut $\frac{1}{20}$ in. long, obovoid, trigonous, white, transversely muricate-verrucose; on each face of the trigonous stalk 4 or 5 minute pores are excavated.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 674; Engl. Hochgebirgsfl. Trop. Afr. 151; K. Schum. in Engl. Pfl. Ost-Afr. C. 129; Rendle in Cat. Afr. Pl. Welw. ii. 134. *S. Hilsenbergii,* Boeck. Cyp. Novæ, i. 34, not of Ridley.

Lower Guinea. Angola: Huilla; in the lofty pastures of Empalaca, *Welwitsch,* 7141! River Callanca, *Newton,* 7!

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan,* 19! and D!

3. **S. melanotricha,** *A. Rich. Tent. Fl. Abyss.* ii. 511. A hairy annual. Stems 4–24 in. long, slender. Leaves often $\frac{1}{2}$–$\frac{2}{3}$ the length of

the stem, $\frac{1}{16}$–$\frac{1}{6}$ in. broad. Cluster of spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., of 3–12 spikelets, sessile, pendent, in a simple spike 2–7 in. long, ciliate with long hairs which may be black-red or white; bracts to the clusters inconspicuous, shorter than the clusters. Spikelets $\frac{1}{5}$ in. long, black-red or pallid. Nut $\frac{1}{16}$ in. long, obovoid, trigonous, straw-coloured, transversely muricate-verrucose.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 673. *S. hirtella*, var. β, γ, partly, Boeck. in Linnæa, xxxviii. 440, 441, and in Flora, 1879, 570.

Nile Land. Abyssinia: Samen; Gapd'a, *Schimper*, 830! British East Africa, Bongo; Gir, *Schweinfurth*, ser. iii. 191

Mozamb. Dist. British Central Africa: Nyasaland; plateau of Mount Zomba, 5000–6000 ft., *Whyte!*

The black-red colour of the hairs in *S. melanotricha* is not a constant character, they are white in Schweinfurth 191.

Var. β *glabrior*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 673. Stems 4–5 in. long. Clusters of spikelets smaller, paler, suberect on the spikes.

Upper Guinea. Sierra Leone: near Regent, *Scott-Elliot*, 4187!

This variety might be appended, perhaps as conveniently, to *S. glomerulata*, Oliver; the clusters of spikelets are considerably smaller than in either species.

4. **S. glomerulata,** *Oliver in Trans. Linn. Soc.* xxix. 170, *t.* 110 *B.* A hairy annual. Stems 6–9 in. long, slender. Leaves $\frac{1}{2}$–$\frac{2}{3}$ the length of the stem, up to $\frac{1}{8}$ in. broad. Clusters of spikelets $\frac{1}{3}$ in. in diam., of 6–12 spikelets, sessile, suberect, in a simple spike 2–4 in. long, ciliate with white hairs; bracts setaceous, lower as long, or twice as long, as the clusters. Spikelets $\frac{1}{5}$ in. long, pale rusty-brown. Nut $\frac{1}{16}$ in. long, obovoid, trigonous, white, strongly transversely muricate.

Nile Land. British East Africa: Madi; among *débris* of Madi rocks, *Speke & Grant*, 668!

According to Capt. Grant's label, the whole plant is sweetly scented.

This is very near *S. melanotricha*, differing in the suberect clusters overtopped by bracts.

5. **S. remota,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 169. Annual, densely hairy or nearly glabrous. Stems 12 in. long, very slender. Leaves 4–8 by $\frac{1}{16}$–$\frac{1}{12}$ in., often flexuose. Cluster of 2–4 spikelets sessile, erect, $\frac{1}{2}$–1 in. apart, in a simple (often flexuose) spike 2–5 in. long; bracts inconspicuous, the lowest hardly longer than the clusters. Spikelets $\frac{1}{4}$ in. long and upwards, ellipsoid-oblong, brown, sparsely hairy or very nearly glabrous. Nut $\frac{1}{16}$ in. long, obovoid, trigonous, white, horizontally muricate.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 674; K. Schum. in Engl. Pfl. Ost-Afr. C. 128; Rendle in Cat. Afr. Pl. Welw. ii. 134. *S. flexuosa*, Boeck. Cyp. Novæ, i. 33; K. Schum. in Engl. Pfl. Ost-Afr. C. 128.

Lower Guinea. Angola: Pungo Andongo, in damp places; near Catete, *Welwitsch*, 7130! between the Serra de Pedras de Guinga and Candumba, *Welwitsch*, 7129! in the Præsidium on the higher slopes of Funda Quilombo, *Welwitsch*, 7131 partly! heights of Pedra Songue, *Welwitsch*, 7131B!

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 60!

6. **S. hispidula,** *A. Rich. Tent. Fl. Abyss.* ii. 511. Annual, thinly hairy. Stems 4–12 in. long, slender. Leaves 4–8 by $\frac{1}{3}$ in., thinly hairy or glabrous. Panicle 2–4 by $\frac{1}{2}$–1 in., the lower branches up to $\frac{3}{4}$ in. long; bracts $\frac{1}{2}$ in. long, setaceous. Clusters of 3–8 spikelets, erect, shortly hispid with black-red or white hairs. Spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. long, ovoid-lanceolate, chestnut marked with green. Nut $\frac{1}{20}$ in. long, obovoid, trigonous, white, reticulated, scarcely muricate or tubercled.—Boeck. in Linnæa, xxxviii. 443; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 672; Engl. Hochgebirgsfl. Trop. Afr. 150. *S. interrupta,* Schlechtend. in Linnæa, xx. 544, not of A. Rich.

Nile Land. Abyssinia: Gafta, *Schimper,* 1277! Tacazze River, *Quartin-Dillon & Petit!* Begemeder; mountains near Senka Berr, *Schimper,* 1266, and without precise locality, *Schimper,* 538!

Var. β *hispidior,* C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 672. Much more hairy. Glumes covered all over by black hairs. Nut black, strongly transversely muricate, tubercled on the shoulders.

Nile Land. Abyssinia: Begemeder; Debra Ari, *Schimper,* 1278!

7. **S. glabra,** *Boeck. Cyp. Novæ,* i. 35. A glabrous annual. Stems 1–2 ft. long, rather stouter than in others of this group. Leaves up to 12 by $\frac{1}{8}$ in. Panicle 2–5 in. long, with erect capillary branches 1–2$\frac{1}{2}$ in. long, sometimes again divided. Clusters of 4–1 spikelets, sub-erect; bracts shorter than the clusters. Spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. long, chest-nut-coloured. Nut $\frac{1}{20}$–$\frac{1}{16}$ in. long, obovoid, trigonous, white, transversely muricate-verrucose.

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan,* 2! Mandala, *Scott-Elliot,* 8507! and without precise locality, *Buchanan,* 1438B!

8. **S. ustulata,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 168. An annual, nearly glabrous except the basal leaf-sheaths. Stems 8–16 in. long, slender. Leaves 8–12 by $\frac{1}{24}$–$\frac{1}{16}$ in. Panicle 2 by $\frac{1}{3}$–$\frac{1}{2}$ in., dense of numerous spikelets; lowest branches usually $\frac{1}{4}$ in. long, occa-sionally up to 1 in. long; bracts setaceous, longer than the clusters. Spikelets $\frac{1}{5}$ in. long, yellowish-brown marked with chestnut-colour. Nut $\frac{1}{16}$ in. in diam., obovoid, white, verrucose-tubercled.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 675; Rendle in Cat. Afr. Pl. Welw. ii. 133.

Lower Guinea. Angola: Pungo Andongo; banks of the River Cuanza, *Welwitsch,* 7134!

This species is very close to *S. pulchella,* Ridley; there is no considerable differ-ence in the inflorescence, but the present is a considerably stouter plant.

9. **S. hirtella,** *Swartz, Prod.* 19. Thinly hairy or almost glabrous, except the spikelets. Rhizome horizontal, $\frac{1}{8}$–$\frac{1}{5}$ in. in diam. Stems 8–24 in. long, slender, narrowed at the base. Uppermost leaves 4–8 by $\frac{1}{12}$–$\frac{1}{6}$ in., lower shorter, the lowest reduced to tight sheaths. Spike (in appearance) simple, 2–5 in. long; clusters of 3–12 spikelets, standing $\frac{1}{4}$–1 in. apart, pendent in fruit; bracts setaceous, usually shorter than

the clusters, the lowest sometimes longer. Spikelets $\frac{1}{6}$ in. long, chestnut or brown, hispid. Nut $\frac{1}{20}$ in. long, ovoid, round-trigonous, smooth, white; pores 3 or 4 on each face of the stalk, minute.—Kunth, Enum. ii. 353; Boeck. in Flora, 1879, 160, and in Linnæa, xxxviii. 439 part of *a* only; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 671, and in Dyer, Fl. Cap. vii. 294; Engl. Hochgebirgsfl. Trop. Afr. 150; K. Schum. in Engl. Pfl. Ost-Afr. C. 128; Urban, Symb. Antill. ii. 140. *Hypoporum hirtellum*, Nees in Linnæa, ix. 303.

Upper Guinea. Sierra Leone, *Afzelius! Morson! Smeathmann*, 85! Lagos: Abeokuta, *Irving!*

Nile Land. British East Africa: Ruwenzori; Kasamagas, 5000 ft., *Scott-Elliot*, 7629! Uganda; Buddu, *Scott-Elliot*, 7441!

Lower Guinea. Gaboon: River Gaboon, *Mann*, 1025! Munda; Sibange Farm, *Soyaux*, 351! Lower Congo: Stanley Pool, 900 ft., *Hens*, B, 58! Kisantu, *Gillet*, 1900! Kimuenza, *Gillet*, 1877!

South Central. Congo Free State, *Dewevre*, 1070! 1077!

Mozamb. Dist. British Central Africa: North Nyasaland, *Scott!*

Also in South Africa, Madagascar, and America.

10. **S. catophylla,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 670. Leaves all close to the base of the stem, 8–14 by $\frac{1}{8}$–$\frac{1}{6}$ in., with many spreading white hairs; otherwise as *S. hirtella*, Sw.—C. B. Clarke in Dyer, Fl. Cap. vii. 294; Rendle in Cat. Afr. Pl. Welw. ii. 132. *S. hirtella*, Boeck. in Linnæa, xxxviii. 439 partly. *S. hirtella*, var. *aterrima*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 166; Engl. Hochgebirgsfl. Trop. Afr. 150.

Upper Guinea. Sierra Leone, *Smeathmann! Afzelius*, 496! Niger Territory: Old Calabar, *Robb!* Nupe, *Barter*, 1561! Cameroons: Sanaga, *Zenker*, 1472!

Lower Guinea. Angola: Huilla; on the higher spongy slopes of Morro de Lopollo, 5000 ft., *Welwitsch*, 7143!

Mozamb. Dist. British Central Africa: Nyasaland, *Buchanan*, 141!

Also in Natal.

11. **S. mechowiana,** *Boeck. in Engl. Jahrb.* v. 510. Rhizome not seen. Stems 12–20 in. long, somewhat densely hairy. Leaves 8–12 by $\frac{1}{6}$ in., suberect, hairy. Spike (apparently simple) 4–8 in. long; rhachis nearly glabrous. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long, in clusters of 5–8, suberect, chestnut-brown. Flower glumes nearly glabrous. Nut white, smooth, or obscurely tessellate.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 672.

Lower Guinea. Angola: Malange, *Mechow*, 345!

12. **S. meyeriana,** *Kunth, Enum.* ii. 354. Nearly glabrous. Rhizome horizontal. Stems about 1 foot long, slender, not thickened at the base. Leaves 8–12 by $\frac{1}{8}$–$\frac{1}{6}$ in. broad. Spike apparently simple, 1–3 in. long; bracts setaceous, lower often longer than the clusters. Clusters few, of 3–8 spikelets, brown, erect in fruit. Spikelets $\frac{1}{6}$ in. long, glabrous. Nut $\frac{1}{20}$ in. long, subglobose, white, smooth; basal pores most minute.—Boeck. in Linnæa, xxxviii. 441; C. B. Clarke in

Durand & Schinz, Conspect. Fl. Afr. v. 673, and in Dyer, Fl. Cap. vii. 294; Rendle in Cat. Afr. Pl. Welw. ii. 133. *S. cæspitosa*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 167.

Lower Guinea. Angola: Huilla; in the woods of Monino, *Welwitsch*, 7137 partly! Pungo Andongo; in marshy meadows between Condo and Quisonde. *Welwitsch*, 7135! in the Præsidium on the higher slopes of Funda-Quilombo, 3300 ft., *Welwitsch*, 7131 partly!

Also in South Africa.

13. **S. Buchanani,** *Boeck. Cyp. Novæ*, i. 33, *emending the character.* Sparsely hairy. Stems 12–20 in. long, the basal sheaths forming ovoid bulbs $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., usually in a row on the horizontal rhizome. Leaves 4–12 by $\frac{1}{8}$ in. Spike (apparently simple) 3–6 in. long; lower bracts often longer than the clusters. Spikelets $\frac{1}{5}$ in. long, in clusters of 4–10, suberect in fruit. Nut $\frac{1}{20}$ in. long, obovoid-ellipsoid, white, smooth.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 669, and in Dyer, Fl. Cap. vii. 295; K. Schum. in Engl. Pfl. Ost-Afr. C. 128.

Nile Land. Upper Sennar: Fazokl, *Figari!* British East Africa: Uganda; River Kalungu, *Scott-Elliot*, 7221!

Mozamb. Dist. Portuguese East Africa: Morambala Mountain, 2000 ft., *Kirk!* British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 32 partly! 1272! Plains of Zomba, 2500–3000 ft., *Whyte!* Zomba and vicinity, *Whyte* and without precise locality, *Buchanan*, 1272!

Also in South Africa and Madagascar.

14. **S. erythrorrhiza,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 167. Hairy. Rhizome horizontal, $\frac{1}{3}$–$\frac{1}{6}$ in. in diam., clothed by short ovate striate scales. Stems 12 in. long, rather slender, scarcely thickened at the base. Lower leaves short; upper 4–6 by $\frac{1}{8}$ in. Spike (in appearance) simple, 1–$2\frac{1}{2}$ in. long; rhachis glabrous; lower clusters distinct, erect in fruit; bracts $\frac{1}{3}$–$\frac{2}{3}$ in. long. Spikelets $\frac{1}{5}$ in. long, the 3 lower glumes hairy. Style 3-fid. Nut (fide *Welwitsch*) smooth.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 670; Rendle in Cat. Afr. Pl. Welw. ii. 133.

Lower Guinea. Angola: Huilla; in wooded meadows near the base of Morro de Ferrao da Sola, *Welwitsch*, 7136!

Numerous species of *Scleria*, annuals as well as perennials, have red or dark-red roots.

15. **S. dregeana,** *Kunth, Enum.* ii. 354. Very thinly hairy or glabrate. Rhizome horizontal, $\frac{1}{8}$ in. in diam. Stems 1–2 ft. long, slender, not thickened at the base. Leaves 4–12 by $\frac{1}{12}$–$\frac{1}{8}$ in. Panicle 2–6 in. long, in the type apparently simple, but in Kirk's example has lower branches $\frac{1}{4}$–$\frac{1}{3}$ in. long; clusters distinct; bracts setaceous, the lower often longer than the clusters. Spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. long, ellipsoid-oblong, chestnut, in erect clusters of 4–8. Nut $\frac{1}{20}$ in. long, globose-ellipsoid, round-trigonous, white, with tubercles on the shoulders, and a few transverse murications.—Boeck. in Linnæa, xxxviii. 443; Ridley

in Trans. Linn. Soc. ser. 2, Bot. ii. 167; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 670, and in Dyer, Fl. Cap. vii. 295; K. Schum. in Engl. Pfl. Ost-Afr. C. 128; Rendle in Cat. Afr. Pl. Welw. ii. 133. *S. setulosa,* Boeck. Cyp. Novæ, i. 33.

Nile Land. British East Africa: Ukamba, 5000–6000 ft., *Scott-Elliot,* 6409 !

Lower Guinea. Angola: Huilla; in the woods of Monino, *Welwitsch,* 7137 partly !

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan,* 36 ! near Sochi Hill, 3000 ft., *Kirk !*

Also in South Africa.

In this group of *Scleria,* the contraction of the panicle into a single rhachis with clusters of sessile spikelets dotted along it is by no means an absolute character; in several species so described, short branches in the panicle may be seen occasionally.

16. **S. schweinfurthiana,** *Boeck. in Flora,* 1879, 570. Clusters of spikelets 10–14 on a rhachis 4–8 in. long. Spikelets numerous, often 10–12 in the clusters which are denser, less sub-erect; otherwise as *S. dregeana.*—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 674; K. Schum. in Engl. Pfl. Ost-Afr. C. 128.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth,* 2193 !

This must be very close to *S. dregeana,* Kunth, the nut being identical. The rhizome has not been seen. In *S. dregeana* the spikelets are more loosely aggregated and point upwards, giving the inflorescence a different aspect.

17. **S. bulbifera,** *A. Rich. Tent. Fl. Abyss.* ii. 510. Stems 1–2 ft. long, each from a bulb $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., distinct on a rhizome $\frac{1}{8}$ in. in diam. Leaves 8–12 by $\frac{1}{10}$–$\frac{1}{6}$ in., broader than in the adjacent species, sometimes exceeding $\frac{1}{4}$ in. in breadth, all springing near the base of the stem, usually nearly glabrous, sometimes with many long spreading white hairs. Panicle very narrow, 4–5 in. long, sometimes apparently a simple spike, sometimes with lower branches $\frac{1}{2}$ in. long; bracts often longer than the suberect clusters. Spikelets 3–7 in a cluster, $\frac{1}{5}$ in. long, chestnut and green, the bracts and lower glumes nearly always distinctly bristly. Nut $\frac{1}{20}$ in. long, subglobose, white, reticulate and slightly verrucose-tubercled; 3 or 4 minute pores excavated in each of the 3 faces of the stalk.—Boeck. in Linnæa, xxxviii. 442; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 669; Engl. Hochgebirgsfl. Trop. Afr. 150; K. Schum. in Engl. Pfl. Ost-Afr. C. 128; Rendle in Cat. Afr. Pl. Welw. ii. 133. *S. atrosanguinea,* Steud. Syn. Pl. Glum. ii. 175. *S. cenchroides,* Hochst. in Flora, 1841, i. Intell. 21, not of Kunth. *S. bulbosa,* var. *pallidiflora,* Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 167.

Nile Land. Abyssinia; Tigre; Mount Sholoda, *Schimper,* 327 ! Adowa, *Quartin-Dillon & Petit !* mountains near Dochli, *Schimper,* 1557 ! Begemeder; Senka Berr, *Schimper,* 1277 ! 1557 ! and without precise locality, *Parkyns !* British East Africa: Leikipia; Larabwal, *Gregory,* 68 !

Lower Guinea. Angola: Pungo Andongo; in damp meadows near Sobato de Muta-Lucala, *Welwitsch,* 7133 !

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 5500 ft., *Volkens*, 2113! British Central Africa: Nyasaland, Mount Zomba, 4000–6000 ft., *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!* Ndurandi, *Scott-Elliot*, 8460!

18. **S. Rehmanni,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 674. Slightly hairy or glabrate. Rhizome $\frac{1}{4}$ in. in diam., stout, rugged. Stems 12–10 in. long, not tufted, nor bulbous at the base. Leaves 4–12 by $\frac{1}{8}$–$\frac{1}{6}$ in. Panicle 2–3 in. long, nearly glabrous, loose; branches slender, lower up to 1–2 in. long; bracts setaceous, inconspicuous, clusters of few (usually 3) spikelets, chestnut-coloured. Spikelets $\frac{1}{6}$ in. long. Nut less than $\frac{1}{20}$ in. in diam., depressed-ovoid, smooth, white.—C. B. Clarke in Dyer, Fl. Cap. vii. 295.

Mozamb. Dist. British Central Africa: Nyasaland, *Buchanan*, 47! 1424! 1435c!

Also in the Transvaal.

19. **S. Welwitschii,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 675. Nearly glabrous, except the leaf-sheaths. Rhizome $\frac{1}{4}$ in. in diam., shining yellow after the scales have worn off. Stems 1–2 ft. long, stouter than in the preceding species. Leaves 8–12 by $\frac{1}{8}$–$\frac{1}{6}$ in., many of the lower abbreviated or reduced to sheaths. Panicle 4–6 by 1–3 in., compound, rather robust, ovoid-lanceolate. Spikelets $\frac{1}{4}$ in. long, brown. Nut $\frac{1}{16}$ in. in diam., obovoid, smooth, white.—Rendle in Cat. Afr. Pl. Welw. ii. 133. *S. junciformis*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 168, not of Thwaites.

Lower Guinea. Angola: Huilla; in wooded meadows near Catumba, *Welwitsch*, 7138! in marshy meadows between Monino and Eme, *Welwitsch*, 7139!

20. **S. Woodii,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 675. Nearly glabrous. Rhizome hardly $\frac{1}{12}$ in. in diam. Stems 12–16 in. long, slender, not dilated nor bulbous at the base. Leaves 8 by $\frac{1}{8}$ in. Panicle up to 6 by 3 in., exceedingly lax, with very distant clusters; branches wavy, almost capillary. Clusters of 3–5 spikelets, brown marked with green; bracts setaceous, shorter or somewhat longer than the spikelets. Nut $\frac{1}{20}$ in. long, obovoid, reticulated, white.—C. B. Clarke in Dyer, Fl. Cap. vii. 295; Rendle in Cat. Afr. Pl. Welw. ii. 133.

Lower Guinea. Angola: Huilla; near the banks of the River Quipumpunhime, Sobato de Humpata, rare, *Welwitsch*, 7140 partly!

Also in South Africa and Madagascar.

21. **S. multispiculata,** *Boeck. Cyp. Novæ*, i. 36. Nearly glabrous. Stolons very numerous, $\frac{1}{2}$–1 in. long, filiform. Stems 12–20 in. long, very slender, apparently in tufts. Leaves 8–12 by $\frac{1}{12}$ in. Panicle 2–4 by 1–$2\frac{1}{2}$ in., compound, dense, with capillary branches; bracts setaceous, inconspicuous. Spikelets nearly all solitary, sessile, a few paired, chestnut-brown, $\frac{1}{8}$–$\frac{1}{6}$ in. long, flattened, glabrous or obscurely puberulous. Lower 5 or 6 glumes distichous, keeled, empty. Nut scarcely $\frac{1}{20}$ in. long, obovoid, white becoming discoloured, with minute trans-

verse lines and tubercles; hypogynous disc 0.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 673 (*multispiculosa*); K. Schum. in Engl. Pfl. Ost-Afr. C. 129; Rendle in Cat. Afr. Pl. Welw. ii. 133.

Upper Guinea. Niger Territory: Nupe; in a swamp near Lom, *Barter*, 1349!

Lower Guinea. Angola: Huilla; in meadows on the banks of the River Quipumpunhime, Sobato de Humpata, *Welwitsch*, 7140 partly! Pungo Andongo; marshy places near Quibanga, *Welwitsch*, 7132!

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 1!

22. **S. poæoides,** *Ridley in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 170. Nearly glabrous except the leaf-sheaths. Rhizome very slender. Stems 8–16 in. long, slender. Leaves 4–12 by $\frac{1}{12}$ in. Panicle $1\frac{1}{2}$–3 in. long, ovoid, compound, dense, with capillary branches. Spikelets numerous, many solitary, $\frac{1}{8}$–$\frac{1}{6}$ in. long, chestnut-brown. Nut minute, verrucose-tubercled; hypogynous disc 0.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 674; Rendle in Cat. Afr. Pl. Welw. ii. 134.

Lower Guinea. Angola: Huilla; in spongy places at Quilebe, near Huilla, *Welwitsch*, 7142!

Mozamb. Dist. British Central Africa: Nyasaland, *Buchanan*, 1452B!

This differs little from *S. multispiculata* but in the denser panicle. Buchanan's example is imperfect, and may not be *S. poæoides*, but it must be of this small group as the ripe nuts show.

23. **S. lithosperma,** *Swartz, Prod.* 18. Nearly glabrous, except the leaf-sheaths. Rhizome horizontal. Stems $1\frac{1}{2}$–3 ft. long, medium-sized or slender, not tufted. Leaves 6–12 by $\frac{1}{8}$–$\frac{1}{5}$ in. Panicle straggling; the remote axillary peduncles carrying a few-flowered irregular corymb or often only a spike of 1–5 separate spikelets; lowest bract altogether similar to the highest leaf. Spikelets in small clusters or solitary, $\frac{1}{6}$ in. long, pale brown marked with green, many monœcious. Nut $\frac{1}{16}$–$\frac{1}{12}$ in. long, obovoid or ellipsoid, smooth, white; hypogynous disc hardly any.—Kunth, Enum. ii. 349; Boeck. in Linnæa, xxxviii. 451; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 685, and in Durand & Schinz, Conspect. Fl. Afr. v. 672; K. Schum. in Engl. Pfl. Ost-Afr. C. 129; Urban, Symb. Antill. ii. 141. *S. puzzolanea*, K. Schum. in Engl. Pfl. Ost-Afr. C. 129. *Scirpus lithospermus*, Linn. Sp. Pl. ed. i. 51.

Nile Land. British East Africa: Mombasa, *Taylor!*

Mozamb. Dist. German East Africa: Usambara; Amboni, *Holst*, 2792.

Throughout tropical and subtropical regions.

24. **S. clathrata,** *A. Rich. Tent. Fl. Abyss.* ii. 510. A nearly glabrous annual, but in one stem a small slender stolon is seen. Stems 6–12 in. long, rather slender, tufted. Leaves 4–12 by $\frac{1}{5}$ in., 3-nerved, mostly with peduncles in their axils (i.e. they may be taken as bracts). Peduncles carrying 1–4 female flowers, the lowest distant 2–5 in.,

capillary, $\frac{1}{2}$–$2\frac{1}{2}$ in. long, nodding. Nut-bearing spikelets exceeding $\frac{1}{4}$ in. in length, pale yellow-green or purple-red; bract to a spikelet about as long as it, narrowly lanceolate. Nut ellipsoid, $\frac{1}{8}$–$\frac{1}{6}$ in. long, hardly apiculate, strongly reticulated, glabrous, white or discoloured leaden-purple; disc short funnel-shaped, pallid, the 3 short lobes ovate, thin, straw-coloured, suberect.—Boeck. in Linnæa, xxxviii. 472; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 170; Engl. Hochgebirgsfl. Trop. Afr. 151; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 670; Rendle in Cat. Afr. Pl. Welw. ii. 134.

Nile Land. Abyssinia: Begemeder Province, *Schimper*, 1236! 1271! 1336! and without precise locality, *Schimper*, 1603!

Lower Guinea. Angola: Pungo Andongo; in the higher meadows of Pedras de Guinga and Matta de Quilanga, and between Caghuy and Sansamanda, *Welwitsch*, 7124!

25. **S. foliosa,** *A. Rich. Tent. Fl. Abyss.* ii. 509. Lowest axillary peduncle hardly exserted from the sheath. Nut ovoid rather than ellipsoid; otherwise as *S. clathrata.*—Boeck. in Linnæa, xxxviii. 455; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 170; Engl. Hochgebirgsfl. Trop. Afr. 150; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 670; K. Schum. in Engl. Pfl. Ost-Afr. C. 128; Rendle in Cat. Afr. Pl. Welw. ii. 134. *S. Dillonii*, Boeck. in Flora, 1878, 38. *S. dumicola*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 169. *S. Hildebrandtii*, K. Schum. in Engl. Pfl. Ost-Afr. C. 129 partly.

Nile Land. Abyssinia: damp places near Gafta, *Schimper*, 1332! Plain of Hamedo, 6000 ft., *Schimper*, 210! Shireh Province, *Quartin-Dillon & Petit!* British East Africa: Unyoro, *Speke & Grant!*

Lower Guinea. Angola: Pungo Andongo, in wet places; between Quilanga and Pedras de Guinga, *Welwitsch*, 7122! and in meadows on the banks of the River Cuanza, near Muta-Lucala, *Welwitsch*, 7123!

Mozamb. Dist. Zanzibar, *Taylor!* German East Africa: Usambara; Duga, *Holst*, 3218!

The stems vary in length from 6 to 24 in., the leaves vary up to 18 by $\frac{1}{4}$ in. The spikelets are chestnut-purple to pale brown. Nearly the whole of the present section are exceedingly alike in general appearance; in the Shireh examples two tufts of *S. foliosa* are mixed with 3 of *S. schimperiana*, and it would be very difficult to sort them without looking at the nut.

26. **S. glandiformis,** *Boeck. in Linnæa*, xxxviii. 458. Nearly glabrous, except the ligule. Rhizome hardly any. Stems 16–24 in. long. Leaves up to 12 by $\frac{1}{3}$ in. Lower peduncles remote, nearly included in the sheath of the bract, carrying oblong inflorescences with 6–12 nuts, whence bracts $\frac{1}{2}$–$1\frac{1}{2}$ in. long diverge. Spikelets nearly $\frac{1}{4}$ in. long, straw-coloured marked with brown. Nut $\frac{1}{6}$ in. long, cylindric, obtuse, tessellated, glabrous; disc short, pallid, the 3 lobes ovate, erect, straw-coloured, hardly longer than the stalk of the nut.—Boeck. in Flora, 1879, 571; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 671.

Upper Guinea. Senegambia, *Heudelot*, 662! Niger Territory: Nupe, ***Barter***, 1042!

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2389 partly! 2500!

27. **S. globonux,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 671. Leaves with spreading hairs or glabrate. Nut large, globose, tessellate, margins of the reticulations glandular or minutely hairy; 3 lobes of the disc subquadrate; otherwise as *S. glandiformis.*—*S. tessellata*, Boeck. in Flora, 1879, 571, not of Willd.

Nile Land. British East Africa: Jur; Jur Ghattas. *Schweinfurth*, 2560!

S. tessellata, Willd., is a common plant in India. All the species of the *Tessellatæ* series are very closely allied; as to the present plant, it appears doubtfully distinct from *S. glandiformis.*

28. **S. nyasensis,** *C. B. Clarke.* Nearly glabrous. Stems 1–2 ft. long. Leaves 4–8 by $\frac{1}{5}$ in. Lowest peduncle remote, often exserted, 1–4 in., filiform, flexuose and nodding, divided with 8–15 spikelets. Spikelets $\frac{1}{4}$ in. long. oblong, from straw-coloured to chestnut. Nut $\frac{1}{10}$ in. long (considerably smaller than in the preceding species), cylindric-ellipsoid, tessellate, white or often dusky, nearly glabrous; disc nearly truncate, the division into 3 lobes obscure.

Mozamb. Dist. British Central Africa: Nyasaland; near Mount Sochi, 3000 ft., *Kirk!* Mount Zomba, 4000–6000 ft., *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!*

Near *S. clathrata*, A. Rich., but the inflorescence much more copious in spikelets, and the nut smaller.

29. **S. complanata,** *Boeck. in Flora*, 1879, 571. Stem 3 ft. long, minutely rough from rusty downwards-pointing points. Nut small, subglobose, coarsely tessellated, pale or discoloured bluish; otherwise as *S. foliosa.*—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 670.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2389 partly!

Perhaps only a variety of *S. foliosa* or of *S. glandiformis*: the nut is sensibly smaller.

30. **S. schimperiana,** *Boeck. in Linnæa*, xxxviii. 466. Slightly hairy or glabrate. Rhizome 0. Stems 16 in. long. Leaves 12 by $\frac{1}{6}$ in., tapering at the tip. Lowest axillary peduncle exserted 1–2 in., flexuose, slender, thickened triangular at the top, carrying 3–5 nuts. Female spikelets $\frac{1}{4}$ in. long, chestnut-brown. Nut large, depressed-globose, smooth, white; 3 lobes of the disc small, oblong, obtuse, pallid. —Engl. Hochgebirgsfl. Trop. Afr. 150; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 674.

Nile Land. Abyssinia: Begemeder; Senka Berr, 7500 ft., *Schimper*, 1235!

Var. *hypoxis*, C. B. Clarke. Leaves $\frac{1}{4}$ in. broad and upwards, very obtuse at the tip. Lower peduncles stouter.—*S. hypoxis*, Boeck. in Linnæa, xxxviii. 465.

Nile Land. Gallabat: region of Matamma, *Schweinfurth*, 2054!

31. **S. canaliculato-triquetra,** *Boeck. in Flora*, 1879, 573. Robust; stem 3–5 ft. long. Leaves 8–12 by $\frac{1}{4}$–$\frac{1}{3}$ in. broad. Lowest axillary peduncle remote, often carrying 20–50 spikelets, often exserted 3–6 in., flexuose, not very slender. Nut $\frac{1}{8}$ in. long or more, ovoid or ellipsoid, longer than broad, white, smooth; 3 lobes of the disc small, ovate, tipped by minute tails.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 670; Rendle in Cat. Afr. Pl. Welw. ii. 135. *S. diurensis*, Boeck. in Flora, 1879, 573. *S. cervina*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 171.

Upper Guinea. Lagos: Abeokuta, *Irving!*

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2389 partly! 2474!

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 730. Angola: Pungo Andongo; marshy places near Quilanga, *Welwitsch*, 7126! spongy places between Mutollo and Candumba, *Welwitsch*, 7127!

Mozamb. Dist. British Central Africa: Nyasaland; Kondowe to Karonga, 2000–6000 ft., *Whyte!* Plains of Zomba, 2500–3000 ft., *Whyte!*

32. **S. Hildebrandtii,** *Boeck. in Flora*, 1880, 454. Nearly glabrous. Rhizome 0. Stems 12–16 in. long. Leaves up to 12 by $\frac{1}{4}$ in., 3-nerved. Lower peduncles remote, often nearly basal, exserted 2–6 in., flexuose, slender, but dilated and triquetrous upwards, carrying about 3 nuts. Nut $\frac{1}{8}$ in. long, cylindric-ellipsoid, smooth, white; disk short, obpyramidal, nearly truncate, i.e., the 3 lobes difficult to make out.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 671; K. Schum. in Engl. Pfl. Ost-Afr. C. 129.

Nile Land. British East Africa: near Mombasa, *Hildebrandt*, 2044!

33. **S. gracillima,** *Boeck. in Flora*, 1879, 570. Glabrous, very slender. Stems 16–24 in. long, almost capillary, each bearing only 2 or 3 nuts. Leaves 4–8 by $\frac{1}{20}$–$\frac{1}{12}$ in. Panicle most slender, with few branches, the lowest peduncle remote, capillary, exserted $\frac{1}{2}$–$1\frac{1}{2}$ in., nodding, with 1 nut. Spikelets appear all 1-sexual, the female fewer, $\frac{1}{6}$–$\frac{1}{5}$ in. long. Nut globose, $\frac{1}{12}$ in. in diam., smooth, white; lobes 3, very short, rounded, subauriculate.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, ser. iii., 189!

Boeckeler says this species is allied to the American *S. torreyana*, Walp., i.e. he places it in the *Tessellatæ* group, which appears right—but it is not near any other of the African *Tessellatæ*.

34. **S. oryzoides,** *Presl, Rel. Haenk.* i. 201. Glabrous, robust. Stolons elongate, $\frac{1}{3}$ in. in diam., without scales, probably floating. Stems 3–6 ft. long, stout; sheaths 3-winged. Leaves 3 ft. by $\frac{2}{3}$ in., or the upper 10 in. by more than 1 in. Panicle apparently terminal without bracts (a small axillary remote one rarely added), 6 by 3 in., dense with innumerable branches and spikelets; usually the upper spikelets or the branches are male, a few of the lower female. Spikelets $\frac{1}{4}$ in. long, oblong, sessile, a rich brown. Nut $\frac{1}{8}$ in. in diam., subglobose,

smooth, white; disc obpyramidal, truncated, with a narrow rusty brown rim, hardly 3-lobed.—Kunth, Enum. ii. 356; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 691, and in Durand & Schinz, Conspect. Fl. Afr. v. 673; Boeck. in Linnæa, xxxviii. 492 (*orizoides*). *S. coriacea*, G. Bertol. in Rendiconti Accad. Bologna, 1854, 34, and in Mem. Accad. Scienz. Istit. Bologna, ser. 1, v. 474, t. 27, fig. 1–3, not of Liebm. *S. Bertolonii*, Martens in Flora, 1857, 570.

Mozamb. Dist. German East Africa: Zanguebar, *Kirk*, 4! Portuguese East Africa: Mozambique, *Bertoloni*.

Also in India, Malaya and Tropical Australia.

35. **S. melanomphala,** *Kunth, Enum.* ii. 345. Robust, hairy, or more often glabrate, except the inflorescence. Rhizome creeping, $\frac{1}{12}$–$\frac{1}{8}$ in. in diam. Stems 2–3 ft. long, very scabrous or nearly smooth on the 3 angles. Leaves up to 24 by $\frac{1}{3}$ in., very scabrous on the margins; sheaths triquetrous or narrowly winged. Inflorescence straggling 1–2 ft., compound, the partial panicles (often long peduncled) dense, oblong or almost linear. Spikelets 1-sexual, $\frac{1}{4}$–$\frac{1}{3}$ in. long, commonly green broadly marked with chestnut, but frequently green, sometimes pale brown. Nut $\frac{1}{8}$ in. long exclusive of the disc, ovoid, smooth, white, the tip often black. Hypogynous disc obpyramidal, large, black-red, glandular, the margin triangular, yellow; lobes 0, except so far as represented by the margin.—Boeck. in Linnæa, xxxviii. 476; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 171; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 672, incl. the var., and in Dyer, Fl. Cap. vii. 296; K. Schum. in Engl. Pfl. Ost-Afr. C. 129; Durand & Schinz, Études Fl. Congo, i. 310; Rendle in Cat. Afr. Pl. Welw. ii. 134. *S. macrantha*, Boeck. in Flora, 1879, 572, not Boeck. in Flora, 1858, 647.

Upper Guinea. Sierra Leone; near Franziga, *Scott-Elliot*, 5046!

Nile Land. British East Africa: Niamniam; in a swamp at Huuh (Hoo) River, *Schweinfurth*, 3746! Uganda; Buddu, *Scott-Elliot*, 7482!

Lower Guinea. Lower Congo: Stanley Pool, 900 ft., *Hens*, B, 67! Kisantu, *Gillet*, 321! 323! Angola: Huilla; by streams near Lopollo, *Welwitsch*, 7144! Pungo Andongo; marshy banks of streams near Quilongo, *Welwitsch*, 7145!

South Central. Congo Free State, *Dewevre*, 712A! Nlempu, *Butaye!*

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 51! Mount Zomba Plateau, 5000–6000 ft., *Whyte!* Tanganyika Plateau at Fort Hill, 4300–6000 ft., *Whyte!* and without precise locality, *Buchanan*, 691!

Also in South Africa and Madagascar.

The black apex of the nut often fixes this species at a glance, but it is sometimes perfectly white.

36. **S. spicæformis,** *Benth. in Hook. Niger Fl.* 556. Somewhat hairy. Rhizome horizontal, $\frac{1}{5}$ in. in diam. Stems 16–24 in. long, $\frac{1}{8}$ in. in diam., leaf-sheaths 3-winged. Leaves 8 by $\frac{1}{8}$ in. Partial panicles oblong, dense, 2 in. long, on very shortly exserted remote axillary peduncles. Spikelets exceeding $\frac{1}{4}$ in. in length, dusky brown. Nut $\frac{1}{16}$ in. in diam., globose-ellipsoid, white, smooth, with about 40 longitudinal

striations; disc obpyramidal, short, pallid; lobes 3, short, rounded, subreflexed.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 675.

Upper Guinea. Sierra Leone: lower slopes of Sugarloaf, *Scott-Elliot*, 3952! *Smeathmann!* Liberia: Grand Bassa, *Vogel*, 107!

37. **S. ovuligera,** *Nees in Linnæa*, ix. 303. Sparsely hairy. Rhizome woody. Stems 1–2 ft. long, $\frac{1}{8}$ in. in diam. Leaves 8–12 by $\frac{1}{5}$ in.; leaf-sheaths triquetrous, hardly 3-winged. Partial panicles 3 or 4, remote, pyramidal, their rhachises glabrous, on erect peduncles exserted 0–1 in. Spikelets $\frac{1}{5}$ in. long, nearly glabrous. Nut $\frac{1}{12}$ in. long, ovoid, round-trigonous, smooth, white or sometimes discoloured leaden or black-purple; disc obpyramidal, short, pallid, the 3 rusty-brown lobes thick, round, reflexed and auriculate.—Boeck. in Linnæa, xxxviii. 497; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 673; Durand & Schinz, Études Fl. Congo, i. 310; Rendle in Cat. Afr. Pl. Welw. ii. 135, not of Steud. *S. Flagellum*, Benth. in Hook. Niger Fl. 555; Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 171. *S. naumanniana*, Boeck. in Engl. Jahrb. v. 94, and in Engl. Gazelle Reise, Bot. 18.

Upper Guinea. Sierra Leone, *Afzelius! Beauvois! Don! Smeathmann!* Cape Verd, *Smith!* Liberia: Monrovia, *Naumann!* Grand Bassa, *Vogel*, 60! *Ansell!* Cameroons: Batanga, *Bates*, 342!

Lower Guinea. Lower Congo: Lutete, 1500–1800 ft., *Hens*, A, 249! Bangala, 1000 ft., *Hens*, C, 132! Caha, *Zilman*, 77! Kimuenza, *Gillet* 792! Angola: Ambriz; damp rocks between Ambriz and Quizembo, *Welwitsch*, 7125!

South Central. Congo Free State, *Dupuis*, 34! *Dewevre*, 526!

38. **S. Barteri,** *Boeck. in Linnæa*, xxxviii. 504. Thinly hairy, extensively (15 ft., *Mann*) rambling, "climbing about 20 ft. above the ground in dense bush" (*Scott-Elliot*). Stems branching, $\frac{1}{12}$–$\frac{1}{6}$ in. thick. Leaves up to 8 by $\frac{1}{6}$ in., very scabrous on the margins; sheaths triquetrous, hardly winged; ligule ovate (or sometimes elongated quadrate), scarious. Axillary peduncles remote, 0–2 in. long, erect, bearing pyramidal panicles 1–1½ by 1 in. Spikelets $\frac{1}{5}$ in. long, nearly glabrous, chestnut-coloured. Nut $\frac{1}{12}$–$\frac{1}{8}$ in. long, ovoid, smooth, very minutely hairy, white or frequently discoloured (brown or shining-purple); disc obpyramidal, black-red; the lobes brown-red, forming a small triangular platter, auriculate.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 669; Durand & Schinz, Études Fl. Congo, i. 309; Durand & De Wild. in. Comptes-rendus Soc. bot. Belg. xxxvi. 90. *S. reflexa*, Benth. in Hook. Niger Fl. 555, not of H. B. & K.

Upper Guinea. Sierra Leone: Kambia, on the River Scarcies, *Scott-Elliot*, 4388! Gold Coast: Ashanti, *Cummins*, 238! Lagos, *Millen*, 97! Lower Niger: Onitsa, *Barter*, 1786! Cameroons: Yaunde, 2800 ft., *Zenker & Staudt*, 376! 423! Batanga, *Bates*, 342! Fernando Po, *Vogel! Mann*, 113! *Roscher*, 87!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 240! Lower Congo: Leopoldville, *Duchesne*, 11! Kisantu, *Gillet*, 457! 468! 1089! Kimuenza, *Gillet*, 1705!

39. **S. racemosa,** *Poir. in Lam. Encycl.* vii. 6. Glabrous, robust. Rhizome thick, covered with ovate-oblong striate black-red scales. Stems 3–6 ft. long, $\frac{1}{6}$–$\frac{1}{3}$ in. in diam. Leaves 1–2 ft. by $\frac{1}{2}$–$1\frac{1}{4}$ in. broad, 3-nerved, scabrous on the edges, near the top suddenly narrowed (præmorse) on each margin; sheaths 3-winged, two wings much stronger than the third; ligule ovate-triangular, often $\frac{1}{4}$ in. long. Inflorescence often 12 in. long; partial panicles 2–3 in. long on stout axillary peduncles, running into a terminal compound panicle. Spikelets all 1-sexual, $\frac{1}{5}$ in. long, pallid or dusky. Female glumes ovate, much shorter than the nut. Nut (but see var. β) ovoid, $\frac{1}{4}$–$\frac{1}{6}$ in. long, smooth, shining, white or variously discoloured chestnut or greenish-brown, top conic, tipped for a time by the style-base; disc large thickened, the lobes forming a cup, the subentire margin of which is densely ciliate with yellow-brown hairs.—Kunth, Enum. ii. 344; Boeck. in Linnæa, xxxviii. 522; Oliver in Trans. Linn. Soc. xxix. 169, t. 111; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 674; K. Schum. in Engl. Pfl. Ost-Afr. C. 129; Durand & Schinz, Études Fl. Congo, i. 310; Durand & De Wild. in Comptes-rendus Soc. bot. Belg. xxxvi. 90; Rendle in Cat. Afr. Pl. Welw. ii. 135. *S. ciliolata*, Boeck. in Flora, 1882, 31. *S. palmifolia*, Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 171, not of Schlechtend. *Ophryoscleria racemosa*, Nees in Mart. Fl. Bras. ii. i. 183.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth,* 1353! Madi; by the side of a stream, *Speke & Grant!* Western side of Ruwenzori, *Scott-Elliot,* 7368!

Lower Guinea. Congo River, *Burton! Laurent!* Angola: Golungo Alto; marshes by the River Cuango, near Sange, *Welwitsch,* 7128!

South Central. Congo Free State, *Dewevre,* 935! Nlempu, *Butaye,* 1184!

Mozamb. Dist. Zanzibar, *Kirk!* British Central Africa: Nyasaland; Songui to Karonga, 1700–2000 ft., *Whyte!* Namasi, *Cameron,* 4!

Also in the Mascarene Islands.

Var. β *depressa*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 674. Nut broader than long, flat or depressed at the top, often with a circular groove.

Upper Guinea. Senegambia: on the shore, *Heudelot,* 368! Senegal, *Michelin!* Cape Verd, *Perrottet!* Gambia, *Ingram!* Lagos, *Millen,* 96! Niger Territory: Nupe; in shady ravines, *Barter,* 921!

This is a striking variety in its extreme form, but there is a complete series of forms passing into typical *S. racemosa*.

40. **S. Vogelii,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 675. Less robust than *S. racemosa*, Poir. Ligule very short, often truncate or nearly so. Nut about $\frac{1}{10}$ in. in diam., considerably smaller than that of *S. racemosa;* margin of the disc somewhat lobed, with scattered white hairs; otherwise as *S. racemosa.*—*S. racemosa* ? Benth. in Hook. Niger Fl. 555.

Upper Guinea. Sierra Leone, *Smeathmann!* Liberia: Grand Bassa, *Vogel,* 59! Lagos: Abeokuta, *Irving!* and without precise locality, *Millen,* 154! Cameroons: Batanga, *Bates,* 317! and without precise locality, *Braun,* 44!

Lower Guinea. Gaboon River, *Mann,* 1023! *Buchholz!*

41. **S. verrucosa,** *Willd. Sp. Pl.* iv. 313. Nut large, ovoid, verrucose, longitudinally plicate-rugose, sometimes tubercled, more often the roughness only indicated by a horizontal median row of obscure depressions; otherwise as *S. racemosa.*—Schumach. Beskr. Guin. Pl. 403; Kunth, Enum. ii. 344; Boeck. in Linnæa, xxxviii. 523; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 675; K. Schum. in Engl. Pfl. Ost-Afr. C. 129; Durand & Schinz, Études Fl. Congo, i. 311. *S. spinulosa*, Boeck. Cyp. Novæ, ii. 30.

Upper Guinea. Sierra Leone: Samu Country, near the sea, *Scott-Elliot*, 4218! Gold Coast: Aburi, *Johnson*, 232! 474! Lagos, *Millen*, 94! Cameroons: Abo, *Buchholz!* Yaunde, *Zenker & Staudt*, 535!

Lower Guinea. Lower Congo: above Stanley Pool, *Johnston!* and without precise locality, *Smith!*

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1350!

The examples of this species with spinulose nuts are easily distinguished from *S. racemosa;* but some of the material is scarcely separable.

42. **S. griegifolia,** *C. B. Clarke.* Glabrous or nearly so. Stolons slender. Stem 12–16 in. long, with only 1 leaf-bearing node in the middle. Leaves (close to the base) several, 8–12 by $\frac{1}{3}$–$\frac{1}{2}$ in., flat, 3-nerved (prominently on the upper surface), bristle-scabrous on the edges and on the keel beneath; stem-leaf only 3 in. long. Panicle 9 in. long, of numerous partial peduncles and slender branches; bracts remarkably few. Spikelets all 1-sexual, $\frac{1}{6}$ in. long, ellipsoid. Stamens 3; anthers linear-cristate as usual in *Scleria.* Female spikelet of 3 glumes, uppermost ovate-lanceolate containing the pistil. Style very short; branches 3, long. Nut $\frac{1}{16}$ in. long, ovoid, round-trigonous, smooth.—*Acriulus griegifolius*, Ridley in Journ. Linn. Soc. xx. 336, and in Trans. Linn. Soc. ser. 2, Bot. ii. 166, t. 22, fig. 1–5; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 675; Rendle in Cat. Afr. Pl. Welw. ii. 132.

Lower Guinea. Angola: Huilla; marshes on the River Cacolobar, near Lake Ivantala, rather rare, *Welwitsch*, 6959!

43. **S. Acriulus,** *C. B. Clarke.* Stems up to 3 ft. long, often with several nodes and leaves. Leaves 1–2 ft. long, scarcely $\frac{1}{3}$ in. broad, keeled, in the dry state folded; otherwise as *S. griegifolia.*—*Acriulus madagascariensis*, Ridley in Journ. Linn. Soc. xx. 336, and in Trans. Linn. Soc. ser. 2, Bot. ii. 166, t. 22, fig. 6–7; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 676; K. Schum. in Engl. Pfl. Ost-Afr. C. 128.

Nile Land. British East Africa: Uganda, *Stuhlmann* (ex *K. Schumann*).

Also in Madagascar.

In this species, as in the preceding, the 2 forming the genus *Acriulus* of Ridley, the style is rather short, the 3 branches long.

Imperfectly known species.

44. **S. Buettneri,** *Boeck. Cyp. Novæ*, i. 36. Stem 1 ft. long, slender, compressed, with acute angles, smooth, glabrous, with several leaves in the middle. Leaves a fine green, stiff-herbaceous, slightly

longer than the stem, flat, $\frac{1}{6}$ in. broad, on the edge very scabrous retrorsely; ligule membranous, elongate, obtuse, coloured, glabrous. Panicles few (about 3), far apart, subtriangular, loose, terminal with several branches, $1\frac{1}{2}$ in. high; branches subsessile, the lower 3 with leaf-like bracts; lateral panicles small, $\frac{1}{2}$–$\frac{2}{3}$ in. high, peduncled, with 3 branches, supported by 3 very long (8–9 in.) bracts; peduncles 1–$\frac{1}{2}$ in. long, compressed; rhachis hairy; bracteoles setaceous, long. Male spikelets 2–3 together, several flowered; female spikelets paired. Glumes variegated with red. Nut hard, stalked, scarcely shorter than the glumes, ovoid, attenuate at the tip, trigonous, minutely hairy, pale violet (or sometimes pallid), shining; margin of disc separated from the nut, very short, rigid, papery, shallowly 3-lobed, plicate wrinkled, pallid; disc persistent on the rhachilla, patelliform, orbicular, pallid within.—Boeck. in Verhandl. Bot. Ver. Brandenb. xxxi. 71.

Lower Guinea. Gaboon: Sibange Farm, *Buettner*, 8 (ex *Boeckeler*).

Somewhat allied to *S. Flagellum*, Benth.

25. **DIPLACRUM**, R. Br. Prod. 240.

Spikelets all 1-sexual; female without rudiment of upper flowers, so that the 1 flower appears terminal; otherwise as *Scleria*.—*Scleria*, Benth. et Hook. f. Gen. Pl. iii. 1070, partly.

Species 6, in Tropical and Subtropical regions, 3 in the Old World, 2 in the New, besides 1 common to both regions.

There is no real line between this genus and *Scleria*; in many small species of *Scleria* the rudiment of the male flower, of 1 or 2 small glumes, is reduced to nute scales or wanting; and the female flower then appears terminal.

Stems 2–5 in. long, slender	1. *D. africanum*.
Stem 20 in. long, robust	2. *D. longifolium*.

1. **D. africanum**, *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 668. A weak, nearly glabrous annual. Stems tufted, 2–5 in. long, slender, leafy their whole length. Leaves 1–$1\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{5}$ in., tip rather suddenly acuminated. Inflorescence of minute axillary heads of spikelets, often continued nearly to the base of the stem; lower heads on peduncles rarely exserted so much as $\frac{1}{6}$ in. Spikelets $\frac{1}{12}$–$\frac{1}{10}$ in. long, ovate-lanceolate, green or yellowish. Glume to female flower ovate-lanceolate, entire at the tip, 3-nerved, concave at the base. Nut minute, subglobose, white, with 10–14 longitudinal striæ from summit to base which do not anastomose.—K. Schum. in Engl. Pfl. Ost-Afr. C. 129. *D. pygmæum*, Boeck. in Linnæa, xxxviii. 434 (excl. the Australian examples), and in Flora, 1879, 569; Oliver in Trans. Linn. Soc. xxix. 170, not of Nees. *D. caricinum*, T. Thoms. in Speke, Nile, Append. 654, not of R. Br.

Upper Guinea. Senegambia, *Heudelot*, 675! Sierra Leone, *Scott-Elliot*, 4341! Niger Territory: Nupe, *Barter*, 1041!

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 2573! Madi, *Speke & Grant!*

2. **D. longifolium,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 669. Nearly glabrous. Stolons slender. Stem 20 in. long, robust, triquetrous. Leaves 24 by $\frac{1}{4}$–$\frac{1}{3}$ in. Inflorescence of 5, distant, short-peduncled, axillary, globose, pale heads $\frac{1}{2}$ in. in diam.; bracts 6 in. long and upwards. Spikelets numerous, female $\frac{1}{5}$ in. long. Female glumes elliptic, mucronate, boat-shaped, many-ribbed, not winged on the keel. Nut about $\frac{1}{20}$ in. long, white, smooth, with obscure longitudinal striations which partially anastomose.—Urban, Symb. Antill. ii. 153. *Pteroscleria longifolia,* Griseb. Fl. Brit. West Ind. 579; Benth. in Hook. Ic. Pl. t. 1347.

Upper Guinea. Sierra Leone: marshy ground near Mofari, *Scott-Elliot,* 4406!

Frequent in Trinidad and Brazil.

Scott-Elliot's 4406 is the only piece of the section *Pteroscleria* yet obtained in the Old World.

26. **ERIOSPORA,** A. Rich.; Benth. et Hook. f. Gen. Pl. iii. 1070.

Spikelets very small, 2–3-flowered, collected in close spikes resembling the spikelets of *Scirpus,* mostly monœcious, about 4-glumed; lowest flower female, upper 1–2 male or sterile. Glumes ovate, boat-shaped, obscurely distichous, very minutely mucronulate, lowest empty, next female. Hypogynous hairs numerous, very fine, or (in *E. villosula*) bristles much stouter. Stamens 3–1; anthers not crested. Nut from an ovoid base, tapering into an elongate conical trigonous beak (style-base); linear part of style short, persistent, branches 3, longer.—Perennials, with linear leaves. Stems with nodes their whole length bearing leaves or bracts. Spikes on slender peduncles in an elongate panicle, copious in the typical species, reduced in *E. Oliveri* to few spikes.

Species 7, scattered through Tropical Africa, the Transvaal and Madagascar.

The majority of the species of this extraordinary genus have the leaf-sheaths exactly like those of grasses; they are equitant, more or less distichous, deeply split down one side, with a ring of white hairs entirely simulating the ligule of grasses at the mouth. The illusion is so complete that where (as in many herbarium examples) the plant has been broken in half, a botantist dealing with a single sheet has described the *Eriospora* and assumed the basal half to be that of some grass accidentally pasted down on the same sheet. This hypothesis would at all events explain to some extent the way in which competent botanists have dealt with species of *Eriospora.* Still more surprising is it to find in *E. pilosa* (and its var.) the leaf-sheath and ligule exactly as of *Scleria.*

*Sclerifoliæ.—Sheaths of the leaves triquetrous, with entire mouth closed by a short-ovate ligule . . . . . 1. *E. pilosa.*

**Graminifoliæ.—Sheaths of the leaves compressed, split deeply down one side, with a ring of short hairs in the mouth.

Stems glabrous. Inflorescence copious, spikes exceedingly numerous.

Spikes $\frac{1}{4}$–$\frac{1}{3}$ in. long, brown or chestnut . . . 2. *E. abyssinica.*

Spikes $\frac{1}{3}$ in. long, yellowish-straw-colour . . 3. *E. schweinfurthiana.*

Stems hairy. Inflorescence much less copious.	
Stems with 4–7 spikes. Hypogynous hairs excessively fine	4. *E. Oliveri.*
Stems with about 30 spikes. Hypogynous bristles stiff, scabrid	5. *E. villosula.*

1. **E. pilosa,** *Benth. in Hook. Ic. Pl.* xiv. 30, *t.* 1342. Minutely and thinly hairy. Base of stem decumbent, 2–3 by $\frac{3}{4}$ in. including the densely packed leaf-bases. Stems 1–2 ft. long, triquetrous, glabrous. Leaves 8–12 by $\frac{1}{5}$ in.; sheaths triquetrous, mouth entire and closed by a depressed rounded ligule as in most *Sclerias*. Panicle 4–12 by 1–3 in., the lowest peduncle remote; peduncles often 4–10 from each axil, capillary, some again paniculately divided. Spikes ovoid, $\frac{1}{5}$–$\frac{1}{4}$ in. long, straw-coloured, of 6–20 spikelets, solitary; peduncle to the spike $\frac{1}{20}$–$\frac{1}{2}$ in.; bracts to the spikelets ovate, acuminate, shortly mucronate. Spikelets $\frac{1}{16}$ in. long. Nut $\frac{1}{10}$ in. long; hypogynous setæ $\frac{1}{2}$ the length of the nut, exceedingly slender, nearly simple.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 676. *Trilepis pilosa*, Boeck. in Linnæa, xxxix. 10.

Upper Guinea. Gold Coast: Afram Plains, *Johnson*, 708! Lagos: Isheri, *Lagos Government*, 11! interior of western Lagos, *Rowland!* Niger Territory: Nupe, *Barter*, 1560!

Var. β *longipes*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 676. Spikes rather larger, purple-brown, bracts to the spikelets more mucronate; peduncles to the spikes longer, sometimes up to 3 in. long.

Upper Guinea. Sierra Leone: "common on bare rocky gneiss, eaten by deer," *Scott-Elliot*, 5644!

2. **E. abyssinica,** *A. Rich. Tent. Fl. Abyss.* ii. 508. Stems compactly tufted, perennial, 1–2 ft. high, compressed at the base, round-trigonous upwards, glabrous. Leaf-sheaths very stout, straw-coloured, much imbricated, strongly striate, split as in grasses with a ring of minute hairs in the mouth. Leaves 4–16 by $\frac{1}{5}$ in., nearly smooth, tough, much rolled up in the dry state. Panicle 8–14 in. long, with usually several peduncles arising from each sheath; these peduncles 3–6 in. long often carrying narrow panicles, nearly smooth. Spikes $\frac{1}{4}$–$\frac{1}{3}$ in. long, ovoid or ellipsoid, pale-brown or brown; bracts to spikelets ovate, acuminate, sometimes mucronate. Spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long. Nut including the beak $\frac{1}{6}$–$\frac{1}{5}$ in. long, long attenuate from an ovoid base, smooth, more or less scabrous on the 3 angles of the beak; hypogynous hairs about $\frac{1}{2}$ the length of the nut (beak included), numerous, simple.—Ridley in Trans. Linn. Soc. ser. 2, Bot. ii. 166; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 676; Engl. Hochgebirgsfl. Trop. Afr. 150; Rendle in Cat. Afr. Pl. Welw. ii. 132. *Rynchospora trigyna*, Hochst. in Flora, 1841, i. Intell. 21. *Trilepis abyssinica*, Boeck. in Linnæa, xxxix. 9.

Nile Land. Abyssinia: Tigre; Mount Semayata, *Schimper*, 233! Begemeder? Anadehr, 7800 ft., *Schimper*, 578!

Lower Guinea. Angola: Loanda, 1000 ft., *Welwitsch*, 7157! Pungo

Andongo; in fissures of rocks on the heights of the Præsidium, 3300 ft., *Welwitsch*, 684!

Var. β *castanea*, C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 676. Spikes a deeper chestnut colour.

Nile Land. Abyssinia: Shireh Province, *Quartin-Dillon & Petit!* Begemeder; Gerra, 8200 ft., *Schimper*, 1262! and without precise locality, *Schimper*, 690!

Bentham, in Benth. et Hook. f. Gen. Pl. iii. 1070, observes that this plant appeared to him a separate species; I have been unable to find any difference except in colour.

3. **E. schweinfurthiana,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 676. Stems 2 ft. long. Leaves $\frac{1}{4}$ in. broad, sometimes minutely hairy on the margins. Spikes $\frac{1}{3}$ in. long or rather more, narrowly ovoid, or dusky straw-yellow colour; otherwise as *E. abyssinica*.—*Carpha schweinfurthiana*, Boeck. in Flora, 1879, 569.

Nile Land. British East Africa: Niamniam; Baginse Mountain, *Schweinfurth*, 3820!

This is, very likely, not really distinct from *E. abyssinica*. The inflorescence and colour might do for some species of *Carpha*.

4. **E. Oliveri,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 676. Stems closely tufted, perennial, 6–12 in. long, setaceous, terete, rather closely covered by very slender white hairs: basal leaf-sheaths deeply split on one side. Leaves nearly as long as the stems, setaceous, hairy. Panicle depauperated, of 4–7 spikes (in the 22 stems present). Spikes $\frac{1}{8}$–$\frac{1}{6}$ in., ellipsoid, fuscous, more or less purple; bracts to the spikelets acuminate, mostly mucronate. Hypogynous bristles nearly as in the preceding species, $\frac{2}{3}$ the length of the nut (beak included), excessively slender, with minute teeth visible under the microscope.—K. Schum. in Engl. Pfl. Ost-Afr. C. 128. *Trilepis Oliveri*, Boeck. Cyp. Novæ, i. 38.

Mozamb. Dist. German East Africa: between the coast and Uyui, *Taylor!* British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 25! at Ndurandi, *Scott-Elliot*, 8459!

5. **E. villosula,** *C. B. Clarke in Trans. Linn. Soc. ser.* 2, *Bot.* iv. 54. Stems 10–20 in. long, rather stouter, rather less hairy. Panicle more evolute, often with 30 spikes or more. Spikes rather broader, brighter chestnut colour. Hypogynous bristles about 12, white, but rigid, rather stout, densely scabrid; otherwise as *E. Oliveri*.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 676; K. Schum. in Engl. Pfl. Ost-Afr. C. 128. *E. viryata*, K. Schum. in Engl. Pfl. Ost-Afr. C. 128.

Mozamb. Dist. German East Africa: Merue, *Fischer*, 624! British Central Africa: Nyasaland; Mount Mlanji, *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!*

The other differences between this and *E. Oliveri* are of small moment; but the hypogynous bristles do not resemble those of any of the other species here described.

27. **CAREX,** Linn.; Benth. et Hook. f. Gen. Pl. iii. 1073.

Spikelets unisexual, female 1-flowered, male (at least in appearance) many-flowered; female arranged in spikes, male often solitary. Female flower consisting of a pistil only, completely enclosed in a utricle (a bottle-like sac), really the bract to a branch of the axis; within this utricle is sometimes a bristle as long as the utricle representing the axis which the utricle subtends. Stamens 3–1; anthers linear-oblong. Style-branches 3 or 2. Nut trigonous or flattened.—Perennial herbs; leaves grass-like.

Species 1400, scattered throughout the World, from the Arctic Circle to the Southern limits of Phaenogams; mostly in moist places.

*VIGNEA.—Styles 2-branched.

†*Capituligeræ*. Stem with 1 spike.

Stem triquetrous; beak linear, $\frac{1}{3}$–$\frac{1}{2}$ the length of the utricle . . . . . 1. *C. monostachya.*

Stem subterete, striate; beak linear, hardly $\frac{1}{5}$ the length of the utricle . . . . . 2. *C. runssoroensis.*

††*Muricatæ*. Panicle dense, of many ovoid spikes female at the base, some male at the top.

Utricle nerveless on the plane face, obscurely 2–3-nerved on the convex face.

Utricle ovoid-triangular, beak triangular or hardly any . . . . . 3. *C. conferta.*

Utricle ellipsoid, acuminated into a lanceolate-linear beak . . . . . 4. *C. leptosaccus.*

Utricle with 5–9 nerves on the convex face.

Utricle $\frac{1}{6}$ in. long, long-lanceolate, attenuate at both ends . . . . . 5. *C. Koestlini.*

Utricle $\frac{1}{8}$ in. long, ovoid-lanceolate, subsessile.

Leaves $\frac{1}{5}$ in. broad; utricle with 7 strong ribs on the convex face . . . . . 6. *C. erythrorrhiza.*

Leaves $\frac{1}{3}$ in. broad; utricle with 7 nerves on the convex face . . . . . 7. *C. Lycurus.*

**CAREX.—Styles 3-branched.

†Spikes (many of them) female at the base, male at the top; panicle long.

Spikes ovoid or oblong, $\frac{1}{2}$ in. long or less (except in *C. Steudneri*), numerous, usually very numerous.

Utricle glabrous. Partial panicles oblong (or in *C. leptocladus* obscurely pyramidal).

Beak much shorter than the body of the utricle.

Leaves $\frac{1}{12}$–$\frac{1}{8}$ in. broad; panicle thin, utricle $\frac{1}{12}$ in. long . . . . . 8. *C. schimperiana.*

Leaves $\frac{1}{3}$ in. broad; panicle rather copious; utricle $\frac{1}{10}$ in. long . . . . . 9. *C. echinochloe.*

Leaves $\frac{1}{4}$–$\frac{1}{3}$ in. broad; panicle rather copious; utricle $\frac{1}{6}$–$\frac{1}{5}$ in. long . . . . . 10. *C. nyasensis.*

Beak nearly as long as the body of the utricle.

Panicle-branches firm; utricle $\frac{1}{5}$ in. long, firm 11. *C. chlorosaccus.*

Panicle-branches capillary; utricle $\frac{1}{6}$–$\frac{1}{5}$ in. long, delicate . . . . . 12. *C. leptocladus.*

Utricle (often minutely) hairy.	
Utricle more than $\frac{1}{4}$ in. long, linear-lanceolate; nut stalked	14. *C. Steudneri.*
Utricle about $\frac{1}{6}$ in. long, ellipsoid, beaked.	
Panicles on axillary peduncles, open pyramidal	13. *C. spicato-paniculata.*
Panicles on axillary peduncles, dense, oblong .	15. *C. condensata.*
Spikes linear-cylindric, 1 in. long at least.	
Utricle exceeding $\frac{1}{4}$ in. in length, linear-lanceolate	16. *C. Johnstonii.*
Utricle $\frac{1}{8}$–$\frac{1}{6}$ in. long, ellipsoid	17. *C. Vallis-Rosetto.*
††Stem with 5–10 elongate cylindric spikes; terminal spike male at the base, with (nearly always) utricles in the upper part.	
Lower spikes male at the base.	
Utricles $\frac{1}{5}$–$\frac{1}{4}$ in. long, scabrous on the beak . .	18. *C. simensis.*
Utricles $\frac{1}{6}$ in. long, smooth on the beak . .	19. *C. longepedunculata.*
Lower spikes female at the base; utricles $\frac{1}{8}$ in. long.	
Beak of utricle minute, subentire . . .	20. *C. petitiana.*
Beak $\frac{1}{3}$–$\frac{1}{2}$ the length of the utricles, bifid . .	21. *C. Fischeri.*
†††Stem with 5–12 elongate cylindric spikes; terminal spike wholly male, or (rarely) with some utricles at the base.	
Utricles straight, narrowed upwards into the beak .	22. *C. boryana.*
Utricles curved, inflated upwards, suddenly contracted into the minute beak	23. *C. cyrtosaccus.*

1. **C. monostachya,** *A. Rich. Tent. Fl. Abyss.* ii. 512. Glabrous. Rhizome short. Stems tufted, 8–22 in. long, triquetrous, rough on the angles; basal sheaths chestnut-red. Leaves often as long as the stems, hardly $\frac{1}{6}$ in. broad, triquetrous in the upper part. Spike 1 on each stem, $1\frac{1}{2}$ by $\frac{1}{4}$ in., male at the top, female below, from chestnut-red to ferrugineous-brown. Female glumes $\frac{1}{4}$–$\frac{1}{3}$ in. long, lanceolate, acute; margins scarious. Anthers $\frac{1}{6}$ in. long, linear. Utricle (without beak) nearly $\frac{1}{6}$ in. long, narrowly obovoid, obtuse, very much compressed, indistinctly nerved, glabrous, rarely slightly scabrid; beak exactly linear, $\frac{1}{3}$–$\frac{1}{2}$ the length of the utricle, very shortly split; rhachilla of the rudimentary spikelet linear, green, included in one margin of the utricle, often as long as the nut. Nut narrowly ellipsoid, flattened, much narrower than the utricle; style $\frac{1}{2}$ as long as the nut, branches 2, much longer than the nut, red-brown, conspicuously exserted.—Boott, Carex, ii. 80, t. 221; Boeck in Linnæa, xxxix. 30; Engl. Hochgebirgsfl. Trop. Afr. 151; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 687; K. Schum. in Engl. Pfl. Ost-Afr. C. 129. *C. parasitica,* Kunze, Suppl. Schkuhr's Riedgr. 83 in note. *C. triquetrifolia,* Boeck. in Engl. Jahrb. vii. 279; Oliver in Trans. Linn. Soc. ser. 2, Bot. ii. 353; Engl. Hochgebirgsfl. Trop. Afr. 153. *Uncinia digyna,* Hochst. in Schimper, Exsicc. 687.

Nile Land. Abyssinia: Samen; Mount Silke, *Schimper,* 687! Mount Bachit, *Schimper!* Begemeder; Mount Guna, 13,100 ft., *Schimper,* 1413! and without precise locality, *Schimper,* 83!

Mozamb. Dist. German East Africa: Kilimanjaro, 12,300 ft., *Volkens,* 1146! *Johnston,* 120!

Boott says the style is sometimes 3-fid; I find all 2-fid in Boott's examples; the utricle is pressed so very flat (as is the nut) that I am surprised to find a 3-fid style even by accident. The name of Kunze has priority; but, as his description may be esteemed insufficient, it is more convenient not to unearth his name.

2. **C. runssoroensis,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 129. Stem terete, smooth with very many striations. Uppermost leaf $\frac{3}{4}$ in. long, not green. Utricle (without beak) $\frac{1}{5}$ in. long, oblong, much flattened, with 6 nerves on the convex face, reddish, beak scarcely $\frac{1}{5}$ the length of the utricle, otherwise as *C. monostachya.*

Nile Land. British East Africa: Ruwenzori, 12,400 ft., *Stuhlmann,* 2454!

This species is exceedingly near *C. monostachya,* A. Rich.; the one stem at Kew appears almost a scape; the utricle is less obovoid and much less beaked than the utricle of any example of *C. monostachya.* A rudiment of the male spikelet is in the utricle.

3. **C. conferta,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 512. Glabrous. Rhizome creeping, divided, up to 6 in. long in dried examples. Stems 1–3 ft. long, medium-sized, triquetrous, rough on the angles. Leaves nearly as long as the stem, $\frac{1}{4}$ in. broad. Inflorescence 2 by $\frac{1}{2}$ in., a dense little-interrupted oblong panicle; lowest bract shorter than the panicle, often only $\frac{1}{2}$ in. long, not sheathing. Spikes $\frac{1}{4}$ by $\frac{1}{5}$ in., dense, female at the base, some male at the top. Female glumes $\frac{1}{10}$ in. long, ovate-triangular, not acuminate, a rich brown, keel yellow. Utricle $\frac{1}{10}$ in. long, sessile, ovoid-triangular, hardly beaked, plano-convex, glabrous, straw-yellow, without nerves on the plane face, obscurely 2–3-nerved on the convex face; beak deeply split on the convex face, margins scabrous; style-branches 2, linear.—Boott, Carex, ii. 76, t. 208; Boeck. in Linnæa, xxxix. 91; Engl. Hochgebirgsfl. Trop. Afr. 151; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 681.

Nile Land. Abyssinia: Samen; by streams near Enjedcap, *Schimper,* 576! near Debra Eski, *Schimper,* 931! Begemeder; near Gafat, *Schimper,* 1323!

Compared by Boott with *C. vulpina,* Linn., of which it has the habit and characters, but a less beaked and less ribbed utricle. It is equally near the corresponding group in South America, of which *C. bracteosa,* Kunze, is a representative.

4. **C. leptosaccus,** *C. B. Clarke.* Inflorescence ovoid, $2\frac{1}{2}$ by 1 in., dense, compound, straw-brown; lowest bract as long as the panicle. Spikes $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{5}$ in., female at the base, a few male at the top. Female glumes $\frac{1}{10}$ in. long, elliptic-lanceolate, hardly mucronate, ferrugineous, keel green. Utricle $\frac{1}{8}$ in. long, hardly stalked, elliptic-lanceolate, beaked, plano-convex, glabrous (a very few hairs on the margins), white, very thin, without nerves on the plane face, obscurely 3-nerved on the convex face; beak lanceolate, $\frac{1}{3}$–$\frac{1}{2}$ the length of whole utricle, deeply split on the convex face; style-branches 2, linear very long, brown-red. Nut ellipsoid, plano-convex, dark brown.

Mozamb. Dist. German East Africa: Kilimanjaro, 10,000 ft., *Thomson!*

5. **C. Koestlini,** *Hochst. ex Steud. Syn. Pl. Glum.* ii. 193. Glabrous. Rhizome $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., whence descend thick smooth

red roots. Stems 1½–3 ft. long, rather stout, triquetrous, rough on the angles. Leaves nearly as long as the stem, ¼–⅓ in. broad. Inflorescence up to 6½ by ¾ in., very dense (sometimes interrupted at the base), from straw-colour to rusty brown; lowest bract not sheathing, usually as long as the panicle, but in one example nearly a foot long. Spikes exceeding ¼ in. in length, female at the base, some male at the top. Female glumes ⅙–¼ in. long, elliptic, acuminate, hardly mucronate. Utricle ⅙–¼ in. long, elongate-lanceolate, attenuated at either end, plano-convex, thin, appearing winged, smooth, with 3–5 thin nerves on the plane face, 9 thin nerves on the convex face, finally straw-coloured; beak elongate-conic, split nearly to the base on the convex face, margins sparingly scabrid; style-branches 2, linear, long.—Boott, Carex, ii. 75 (excl. var. β), tt. 204, 205; Boeck. in Linnæa, xxxix. 101; Engl. Hochgebirgsfl. Trop. Afr. 151 excl. *C. Steudneri*; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 686.

Nile Land. Abyssinia: Samen; near Demerki on Mount Bachit, 10,500 ft., *Schimper*, 66! 1244! and without precise locality, *Schimper*, 1036! 1037!

In this critical series, Schimper's 1244 (figured by Boott, l. c. t. 205) is the type of the species; but the description above given is taken from Schimper's 1036, 1037, which are figured in Boott, l. c. t. 204; because in these latter the utricles and nuts are fully ripened.

6. **C. erythrorrhiza,** *Boeck. in Linnæa*, xxxix. 103. Leaves ⅕ in. broad. Inflorescence 2 by ½–1 in., excessively dense, chestnut-brown. Utricle ⅛ in. long, sessile, ovoid-lanceolate, irregularly nerved on the plane face, with 7 strong ribs on the convex face; beak lanceolate; otherwise as *C. Koestlini*.—Engl. Hochgebirgsfl. Trop. Afr. 151; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 684. *C. Koestlini*, var. β *minor*, Boott, Carex, ii. 76, tt. 206, 207.

Nile Land. Abyssinia: Samen; near Demerki, on Mount Bachit, 10,500 ft., *Schimper*, 170! 170A! near Debra Eski, 9000 ft., *Schimper*, 170B! Debra Kana, 9300 ft., *Schimper!* Begemeder; Mount Guna, 11,400 ft., *Schimper*, 1556!

This species is founded on Schimper, 1556; the description above given is taken from Schimper, 170, which is Boott's t. 206.

It is very doubtful whether Boeckeler should be followed in giving Boott's var. β specific rank; Boeckeler had very poor material compared with Boott; and, in grounding his species on the red roots, he was unaware that the remarkable roots are just the same in typical *C. Koestlini*. Both the species appear to have been collected at nearly or quite the same localities. On the other hand, the difference between the utricles in Schimper 1036 (Boott, l. c. t. 204), and Schimper 170 (Boott, l. c. t. 206) appears too great to combine the two under one species. Boott discusses the question, and considers his series shows a perfect gradation from the one to the other; but it appears that several of these "intermediates" are not well ripened.

7. **C. Lycurus,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 129. Glabrous. Stems 3 ft. long and upwards, stout, triquetrous, rough on the angles. Leaves ¾ the length of the stems, ⅓ in. broad or even more. Inflorescence 3 by ⅔–¾ in., dense, somewhat interrupted at the base, dusky green; lowest bract 1–2 in. long, setaceous. Spikes ¼–⅙ in., female at

the base, some male at the top. Female glumes $\frac{1}{8}$ in. long, ovate, acute, in fruit pale brown and very thin. Utricle $\frac{1}{8}$ in. long, sessile, ovoid-lanceolate, plano-convex, with 7–9 thin nerves on the convex face, black-green, smooth; beak lanceolate, slightly scabrous on the margins. Style-branches 2, long.

Mozamb. Dist. German East Africa: Usambara; Heboma, *Holst*, 2554! Kwa Mshuza, *Holst*, 8971!

K. Schumann justly compares this species with *C. vulpina*, Linn., from which it differs but little; the leaves are rather broader, while the utricle is smaller, less elongate, and gets very black when ripe.

8. **C. schimperiana,** *Boeck. in Linnæa*, xl. 373. Green, nearly glabrous. Rhizome short, woody, slender. Stems 8–24 in. long, slender. Leaves 8–12 by $\frac{1}{12}$–$\frac{1}{8}$ in. Inflorescence 8–14 by $\frac{1}{2}$–$1\frac{1}{2}$ in., very thin, lower peduncles remote with only 2–6 spikes. Spikes $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., uppermost with 3–5 utricles and a small oblong scarious-yellow male termination. Female glumes (including bristle) about as long as the utricle, ovate, $\frac{2}{3}$ the length of the utricle, scarious white, glabrous, the green keel excurrent in a rough bristle. Utricle $\frac{1}{12}$ in. long, ellipsoid, trigonous, glabrous, green, finally black-brown, with about 24 well-marked nerves; beak about $\frac{1}{4}$ the length of the utricle, smooth; nut ellipsoid, trigonous, quite filling the utricle.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 690; Engl. Hochgebirgsfl. Trop. Afr. 152. *C. ramosa*, K. Schum. in Engl. Pfl. Ost-Afr. C. 129 partly, not of Schkuhr.

Nile Land. Abyssinia: Begemeder; near Debra Tabor, 8500 ft., *Schimper*, 1318! British East Africa: Ruwenzori, 6000–8000 ft., *Scott-Elliot*, 7455!

Mozamb. Dist. German East Africa: Usambara; Kwa Mshuza, *Holst*, 8953!

9. **C. echinochloe,** *Kunze, Suppl. Schkuhr's Riedgr.* 47, *t.* 12. Glabrous except the densely and minutely hairy branches of the panicle. Lateral basal offshoots equivalent to short stolons. Stems $1\frac{1}{2}$–3 ft. long. Leaves 14 by $\frac{1}{3}$ in. Panicle 6–14 by 2 in., oblong, lower peduncles remote, carrying oblong (not pyramidal) loose partial panicles of 6–30 spikes, bracts overtopping the panicles, or rather shorter. Spikes in fruit $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{5}$ in., greenish-yellow, with about 5–8 utricles, male at the top; lowest empty glume bract-like, often caudate with a bristle $\frac{1}{4}$ in. long (whence the specific name); but sometimes on the type specimens the bristle is obsolete. Female glume as long as the utricle, acuminate, shortly aristate, from a broad ovate base, several-nerved in the middle of the back, smooth, scabrous only on the bristle. Utricle (including beak) $\frac{1}{10}$ in. long, broadly ellipsoid, trigonous, narrowed at each end, glabrous, with about 18 well-marked ribs; beak scarcely $\frac{1}{3}$ the length of the utricle, scabrid, shortly 2-toothed. Nut ellipsoid, trigonous, dark-brown, not closely filling the utricle.—A. Rich. Tent. Fl. Abyss. ii. 513; Boott, Carex, i. 62, t. 166, and in Journ. Linn. Soc. vii. 226; Boeck. in Linnæa, xl. 340; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 683; Engl. Hochgebirgsfl. Trop. Afr.

152. *C. ramosa*, K. Schum. in Engl. Pfl. Ost-Afr. C. 129 partly, not of Schkuhr.

Upper Guinea. Cameroons: Cameroon Mountain, 7000 ft., *Mann*, 1359! 2106!

Nile Land. Abyssinia: Tigre; in open stony places on the upper part of Mount Scholoda, *Schimper*, 26! Adowa, *Quartin-Dillon & Petit!* Alsega, on mountains, 6000 ft., *Schimper*, 538! Begemeder; Senka Berr, 8200 ft., *Schimper*, 1314! British East Africa: Ruwenzori; Kivata, 6000–8000 ft., *Scott-Elliot*, 7579!

Mozamb. Dist. German East Africa; Usambara; at Mbaruma, *Holst*, 2484!

This is nearly allied to *C. schimperiana*, and sorted with it by K. Schumann; it has broader leaves and a more copious inflorescence.

10. **C. nyasensis,** *C. B. Clarke.* Glabrous except the densely and minutely hairy branches of the panicle. Stems 1½–3 ft. long. Leaves 14 by ¼–⅓ in. Panicle 8–16 by 2 in., oblong, lower peduncles remote carrying oblong (not pyramidal) partial panicles of 6–15 spikes; bracts mostly overtopping the inflorescence. Spikes in fruit ½ by ¼ in. (sometimes larger) with about 10 utricles, male at the top, rusty green. Female glume as long as the utricle, acuminate, shortly aristate, from a broad ovate base, several-nerved in the middle of the back, smooth, scabrous on the bristle. Utricle (including beak) ⅛–⅕ in. long, ellipsoid, trigonous, narrowed at each end, with about 18 ribs; beak ⅓ the length of the utricle, scabrous, deeply bifid into 2 long-lanceolate teeth. Nut ovoid-ellipsoid, trigonous, dark-brown, well filling the utricle.

Mozamb. Dist. British Central Africa: Nyasaland; North Nyasa, *Whyte!* Masuku Plateau, 6500–7000 ft., *Whyte!* Zomba Plains, 2500–3000 ft., *Whyte!* and without precise locality, *Buchanan*, 165! 534!

11. **C. chlorosaccus,** *C. B. Clarke in Journ. Linn. Soc.* xxxiv. 298. Nearly glabrous, the panicle branches scabrid, hardly hairy. Stems tufted, perennial, 1–2 ft. long. Leaves 6–15 by ¼ in. Panicle 4–14 by 1–3 in.. green; lower peduncles remote, with oblong (not pyramidal) panicles of 8–20 spikes; bracts overtopping the inflorescence. Spikes in fruit ⅓–½ by ¼ in., with 8–10 utricles, male at the top. Female glume (including the bristle) much shorter than the utricle, ovate, acuminate, aristate, greenish-yellow with 3 green nerves on the back, glabrous, the bristle scabrous. Utricle (including the beak) ⅕ in. long, narrowly ellipsoid, attenuate into a beak forming ⅔ at least of the fruit, very green, glabrous, with 5 strong nerves; beak linear, smooth, with 2 short lanceolate teeth; nut oblong, trigonous.—*C. wahlenbergiana*, Boott in Journ. Linn. Soc. vii. 225; Engl. Hochgebirgsfl. Trop. Afr. 152; K. Schum. in Engl. Pfl. Ost-Afr. C. 129 partly; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 691 partly. *C. ramosa*, K. Schum. in Engl. Pfl. Ost-Afr. C. 129 partly.

Upper Guinea. Fernando Po: Clarence Peak, 8000 ft., *Mann*, 653!

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 7200 ft., *Volkens*, 1274! *Johnston!*

12. **C. leptocladus,** *C. B. Clarke.* Glabrous, the panicle-branches thinly scabrous-hairy. Root woody, rugged. Stem (panicle included)

14 in. long, rather slender. Basal leaves many, 20 by $\frac{5}{16}$ in., tough, 3-nerved. Panicle 9 in. long, thin, of few peduncles; lowest peduncle 6 by 2 in., almost capillary, with delicate little-divided branches and 14 spikes; bracts overtopping the inflorescence. Spikes $\frac{1}{2}$ by $\frac{1}{5}$ in., very slender, with 8 utricles, male at the top. Female glumes ovate, acuminate, aristate, about $\frac{2}{3}$ the length of the utricle, glabrous, 3–5-nerved on the back, yellowish-green, very thin, distant. Utricle (beak included) $\frac{1}{6}$–$\frac{1}{5}$ in. long; beak longer than the small oblong-ellipsoid yellow-green glabrous delicate utricle, nearly linear, scabrous with 2 short teeth. Nut ellipsoid, trigonous, filling the utricle.—*C. cruciata* ? Boott in Journ. Linn. Soc. vii. 225; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 681. *C. filicina* ? Engl. Hochgebirgsfl. Trop. Afr. 152 in obs.

Lower Guinea. Isle of St. Thomas: summit of the peak, *Mann !*

This is not near any form of *C. cruciata*, Nees; it may be a state of *C. filicina*, Nees; but no Indian example of *C. filicina* has such very slender peduncles and utricles.

13. **C. spicato-paniculata,** *C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr.* v. 690. Glabrous, except the panicle-branches and utricles. Stems 2–3 ft. long. Leaves 18 by $\frac{1}{4}$–$\frac{1}{3}$ in. Inflorescence up to 16 by 4 in., of 4–7 axillary peduncled compound pyramidal panicles; panicle-branches densely pilose; spikes 50–150 to a stem, $\frac{1}{3}$ in. long, ovoid in fruit, with 6–8 utricles, male at the top. Female glumes ovate, acute, mucronate, as long as the utricles, bright ferrugineous-brown, glabrous, striate for nearly their whole breadth. Utricle (nearly ripe) green, $\frac{1}{6}$ in. long (beak included), ellipsoid, contracted into a beak hardly $\frac{1}{2}$ its own length, 12–15-ribbed, minutely hispid from the top to below the middle, straight; beak scabrous, with 2 lanceolate teeth; nut ellipsoid, black, filling the utricle.—C. B. Clarke in Dyer, Fl. Cap. vii. 304.

Mozamb. Dist. German East Africa: *Hannington !*

Also in South Africa and the Mascarene Islands.

There also may be conspecific with Hannington's plant Scott-Elliot's 6899 (collected in Mau District, British East Africa, at an elevation of 7000 ft.), with hairy utricles; and Schimper 1314 ? (collected in Abyssinia at Senka Berr), exceedingly young.

14. **C. Steudneri,** *Boeck. in Linnæa,* xl. 364. Glabrous except the minutely scabrous panicle-branches and utricles. Rhizome stout. Stems 2–4½ ft. long, robust. Leaves 2 ft. by $\frac{1}{3}$ in., stout. Panicle 11 by 2 in., the partial panicles narrowly oblong, erect, dense, chestnut or deep brown; bracts overtopping the panicle. Spikelets $\frac{3}{4}$ by $\frac{1}{6}$ in., with 6–8 utricles, male at the top. Female glumes elliptic-lanceolate, sometimes mucronate, rather shorter than the utricles, brown or chestnut, hardly striate except near the keel, minutely hispid over the top of the back. Utricle exceeding $\frac{1}{4}$ in. long, linear-lanceolate, triquetrous, densely hispid, beak about $\frac{1}{2}$ the length of the utricle, linear, very hispid, deeply split at least on the convex face. Nut $\frac{1}{10}$ in. long,

oblong, dark-brown on a long yellow stalk.—C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 690, and in Journ. Linn. Soc. xxxiv. 297. *C. wahlenbergiana*, var. δ, Boott, Carex, ii. 102, t. 304.

Nile Land. Abyssinia: Samen; Mount Silke, 9000–10,000 ft., *Schimper*, 545! near Demerki, 11,000 ft., *Schimper*, 1038! Begemeder Province, *Schimper*, 1559!

See remarks under *C. chlorosaccus* above.

15. **C. condensata,** *Nees in Wight, Contrib.* 123. Axillary peduncled panicles oblong, dense, ferrugineous or chestnut-red. Spikes usually with 1–4 utricles at the base and several males above. Female glumes (in the Mlanji example) with minute suberect hairs on the upper part; otherwise nearly as *C. spicato-paniculata*.—Boott, Carex, ii. 86, tt. 247, 248; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 716, and in Dyer, Fl. Cap. vii. 305.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Mlanji, *Whyte!*

16. **C. Johnstonii,** *Boeck. in Engl. Jahrb.* vii. 278. Stems 2–3 ft. high, robust. Leaves up to 2 ft. by $\frac{1}{3}$ in., nearly glabrous, but when young minutely scabrous hairy on some of the numerous nerves. Panicle 10–16 by 1–2 in., the lower peduncles long but erect; partial panicles very narrow; whole number of spikes 20–40, green, ferrugineous-brown-marked. Spikes 1–1$\frac{1}{2}$ by scarcely $\frac{1}{4}$ in., linear, with large distant suberect utricles, male at the top. Female glumes lanceolate, not aristate, pale hyaline, shorter than the utricle. Utricle $\frac{5}{16}$ in. long, linear-lanceolate, pallid with few obscure nerves, thinly hairy nearly to the base; beak hardly $\frac{1}{4}$ the length of the utricle with 2 lanceolate teeth; style-branches 3, red-brown, long exserted; nut oblong, trigonous. —Oliver in Trans. Linn. Soc. ser. 2, Bot. ii. 353; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 686; Engl. Hochgebirgsfl. Trop. Afr. 151; K. Schum. in Engl. Pfl. Ost-Afr. C. 129. *C. Volkensii*, K. Schum. in Engl. Pfl. Ost-Afr. C. 130.

Nile Land. British East Africa: Ruwenzori; Kivata, *Scott-Elliot*, 7778!

Mozamb. Dist. German East Africa: Kilimanjaro; above Marangu, *Volkens*, 1124! *Johnston!*

17. **C. Vallis-Rosetto,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 130. Glabrous, or nearly so. Stems 2 ft. (at least) long, robust. Leaves as long as the stems, $\frac{1}{4}$–$\frac{1}{3}$ in. broad. Panicle 8–12 in. long, of 6–12 loosely scattered spikes; bracts as long as the panicle. Spikes 1–3$\frac{1}{2}$ by $\frac{1}{6}$–$\frac{1}{4}$ in., rusty-brown, male at the top. Female glumes as long as the utricle, ovate, glabrous, rusty-brown, the 1–3-nerved green keel excurrent as a mucro or short bristle. Utricles $\frac{1}{8}$–$\frac{1}{6}$ in. long (beak included), ellipsoid, trigonous, green, glabrous, very irregularly nerved, contracted into a beak less than $\frac{1}{2}$ their length, smooth or nearly so, with 2 rather small lanceolate teeth.

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 6500 ft., *Volkens*, 1291! and at the foot of Kifiniki Volcano, 8800 ft., *Volkens*, 1342!

The spikes in 1291 are 1 in. long, in 1342 are 3 in. long; but by K. Schumann considered (I think correctly) conspecific. A curious feature in this species is

the irregularity in the utricle; some of its nerves are very strong, some very weak, some are continued to the beak, others become obscure in the upper part of the utricle.

18. **C. simensis,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 514. Glabrous, stoloniferous. Stems 2–3 ft. high, with 4–9 spikes. Leaves 12–18 by $\frac{1}{4}$–$\frac{1}{3}$ in. Spikes $\frac{1}{2}$–$2\frac{1}{2}$ by $\frac{1}{4}$ in.; terminal male, with utricles in the upper part or to the top; lower spikes female, often with a few males near the base; upper peduncles short, lower often remote, then 2–4 in. long. Female glumes shorter than the utricles, rusty-brown or chestnut, elliptic-lanceolate, with a very short mucro or quite muticous. Utricles $\frac{1}{5}$ in. long or rather more, ellipsoid, trigonous, obscurely or slenderly ribbed, glabrous, dotted with red glands, tapering at the top; beak less than $\frac{1}{3}$ the length of the utricle, linear-conic, scabrous on the margins, teeth 2, lanceolate, rather short. Nut rather large, sessile, narrowly obovoid, trigonous.—Schweinf. Beitr. Fl. Aethiop. 295. *C. æthiopica*, Boott, Carex, iii. 110 partly, i.e. tt. 343, 344, and in Journ. Linn. Soc. vii. 226; Boeck. in Linnæa, xli. 285 partly; C. B. Clarke in Durand & Schinz, Conspect. Fl. Afr. v. 679 partly; Engl. Hochgebirgsfl. Trop. Afr. 152.

Upper Guinea. Cameroons: Cameroon Mountain, 7000–10,000 ft., *Mann*, 2099!

Nile Land. Abyssinia: Samen; on Mount Bachit, *Schimper*, 1180! Begemeder; Mount Guna, 11,400 ft., *Schimper*, 1289! near Gafat, 8800 ft., *Schimper*, 1298! British East Africa: Ruwenzori; Kivata, 6000–8000 ft., *Scott-Elliot*, 7578!

Boott has called this "*C. æthiopica*" and has noted that the spikes are all male at the base. In the true *C. æthiopica* of Schkuhr (the South Africa plant) the terminal spike is wholly male; and what is of more importance the lower spikes are not male at the base. In the *C. æthiopica* of Schkuhr, the female glumes are definitely bristle-tipped and longer than the utricle.

Whether the present tropical plant be esteemed a species or only a variety of *C. æthiopica*, it is geographically separable.

19. **C. longepedunculata,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 130. Female glumes longer than the utricles, muticous. Utricles $\frac{1}{6}$ in. long; beak not scabrous; otherwise as *C. simensis.*

Mozamb. Dist. German East Africa: Kilimanjaro; near the Noholu cave, 10,400 ft., *Volkens*, 2015!

This has all the spikes female at the base; and is much nearer *C. simensis* than either is to *C. æthiopica.* The lowest remote peduncle is long, as also in *C. simensis.*

20. **C. petitiana,** *A. Rich. Tent. Fl. Abyss.* ii. 513. Glabrous, stoloniferous. Stems 3 ft. high, with 5–7 spikes. Leaves 2 ft. by $\frac{1}{3}$ in. Spikes 2–4 in. by $\frac{1}{4}$–$\frac{1}{3}$ in.; terminal spike male at the base, female above, sometimes with males at the top. Male glumes $\frac{1}{3}$ in. long, narrow-lanceolate, muticous, a rich brown. Female glumes as long as the utricles, similar to the males, cuspidate or muticous. Utricles $\frac{1}{8}$ in. long, narrow-ellipsoid trigonous, with 8–10 slender nerves, glabrous,

dotted by red glandular marks; beak linear, not $\frac{1}{5}$ the length of the utricle, very narrow, glabrous, with small subentire mouth.—Boott, Carex, ii. 88, t. 259; Boeck. in Linnæa, xl. 411; Engl. Hochgebirgsfl. Trop. Afr. 152; C. B. Clarke in Dyer, Fl. Cap. vii. 306. *C. anomala*, Steud. Syn. Pl. Glum. ii. 230; Schweinf. Beitr. Fl. Aethiop. 295. *C. robusta*, Hochst. ex Steud. Syn. Pl. Glum. ii. 230.

Nile Land. Abyssinia: Samen; Demergui (Demerki), 11,000 ft., *Schimper*, 1038! Begemeder, *Schimper*, 1299! *Quartin-Dillon & Petit* (ex *Boott*).

In this species the spikes vary much in thickness, and the female glumes in length and acuteness. The characteristic feature is the minute subentire beak of the utricle.

21. **C. Fischeri,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 130. Spikes $2\frac{1}{2}$ by $\frac{1}{5}$ in. Utricles (beak included) $\frac{1}{8}$ in. long, with numerous slender nerves; beak $\frac{1}{3}$–$\frac{1}{2}$ the length of the utricle, with 2 lanceolate teeth: otherwise as *C. petitiana*.

Mozamb. Dist. British East Africa: Abori, *Fischer*, 640!

This has the spikes more slender than the slenderest examples of *C. petitiana*, and the distinctly bifid beak to the utricle distinguishes it. It appears to be allied to *C. petitiana*, but the description of K. Schumann is so short, and the example seen so fragmentary, that it is possible it may be nearer *C. pendula*, Hudson.

22. **C. boryana,** *Schkuhr, Riedgr*, ii. 43, *t. Gggg, fig.* 191. Glabrous. Stems 2–3 ft. long, with 6–12 scattered spikes. Leaves 18 by $\frac{1}{4}$–$\frac{1}{3}$ in. Spikes $1\frac{1}{2}$–3 by $\frac{1}{5}$–$\frac{1}{3}$ in., elongate-cylindric, terminal (sometimes 2 or 3 terminal), wholly male in nearly all the Tropical African material, sometimes terminal spike female at the base, lower spikes always female at the base usually with a few males at the top. Glumes male and female elliptic-lanceolate, acute, hardly bristle-tipped, chestnut or bright brown, green on the back, female rather shorter than the utricle. Utricles (beak included) $\frac{1}{6}$–$\frac{1}{5}$ in. long, ellipsoid, narrowed gradually into the beak, sessile, plano-convex, smooth, with 5 nerves on the plane and 9 on the convex surface, more or less variegated or dotted with red; beak about $\frac{1}{3}$ the length of the utricle, linear-conic or linear, smooth or very sparingly scabrous, with 2 well-marked lanceolate teeth. Nut narrowly ellipsoid, trigonous, dark-brown.—Kunth, Enum. ii. 506; Boott, Carex, iii. 110, tt. 345–347, and var. *minor*, t. 348 (which is drawn from G. Mann's plant cited below), and in Journ. Linn. Soc. vi. 22, vii. 225; Boeck. in Linnæa, xli. 283 excl. var. γ; Engl. Hochgebirgsfl. Trop. Afr. 153.

Upper Guinea. Fernando Po: Clarence Peak, 7500–8500 ft., *Mann*, 661! 1478!

Nile Land. British East Africa: Ruwenzori; Yeria River, 10,000 ft., *Scott-Elliot*, 7873!

Also in the Mascarene Islands.

The examples of G. Mann and of Scott-Elliot agree very fairly with some of the small *C. boryana* from Bourbon; and the above description is narrowed down to these. The large Madagascar *C. boryana* has utricles exceeding $\frac{1}{4}$ in. long, with aristate glumes $\frac{1}{3}$ in. long.

23. **C. cyrtosaccus,** *C. B. Clarke.* Glabrous. Stems 2 ft. long, with 6–10 scattered spikes. Leaves 14 by $\frac{1}{3}$ in., somewhat 3-nerved. Spikes up to $3\frac{1}{2}$ by $\frac{1}{3}$ in., uppermost 1–3 wholly male, or (even the terminal) sometimes female at the base; lower spikes female with usually a few males at the top. Glumes a fine brown or chestnut, green or yellow on the back; female glumes oblong, truncate at the top, often minutely torn or subciliate, with a very short mucro. Utricles (beak included) $\frac{1}{5}$ in. long, oblong-obovoid, strongly curved, inflated upwards, suddenly narrowed into the beak, glabrous, yellow-green, with about 3 nerves on the plane and 5 on the convex face; beak hardly $\frac{1}{4}$ the length of the utricle, linear, hardly at all scabrid, with 2 lanceolate teeth. Nut narrowly ellipsoid, trigonous, brown-black.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Mlanji, *Whyte!* Mount Malosa, 4000–6000 ft., *Whyte!* Mount Zomba, 4000–6000 ft., *Whyte!*

Very closely allied to *C. boryana.*

ADDENDA.

Order CXLIIa. **MAYACEÆ.** (By N. E. Brown.)

Flowers regular, hermaphrodite. Calyx inferior; sepals 3, herbaceous, narrowly imbricate in the bud, persistent. Petals 3, hypogynous, obovate or suborbicular. Stamens 3, hypogynous, free; filaments short; anthers erect, basifixed, subtetragonal, 4-celled, opening by a terminal pore or by a short apical tube. Ovary superior, 1-celled, with 3 parietal placentas; style filiform, stigma entire; ovules numerous, orthotropous. Capsule 3-valved; valves placentiferous down the middle. Seeds numerous, ovoid or globose, with a basal hilum and terminated by a small tubercle, striate, often rugulose or pitted; albumen farinaceous?; embryo minute, very shortly and broadly conical or sublenticular, seated at the apex of the albumen.—Small herbs, somewhat moss-like, growing in wet places or in slowly running streams. Stems densely covered with linear or filiform leaves. Flowers solitary in the axils of the leaves, 1–3 to a branch, or several clustered at the apex of the stem, on long peduncles.

A small monotypic order of about 8 species, all natives of America with the exception of the following, which has recently been discovered in Angola.

1. **MAYACA,** Aubl.; Benth. et Hook. f. Gen. Pl. iii. 843.

Characters as for the Order.

1. **M. Baumii,** *Gürke in Engl. Jahrb.* xxxi., *Beibl.* 69, 1. Stem growing to a length of 20 in. Leaves 6–7 lin. long, $\frac{1}{2}$ lin. broad, sessile, linear-subulate, 2-toothed at the apex. Peduncles 2–3, umbellately clustered near the apex of the stem, bent downwards after flowering, $\frac{1}{2}$–1 in. long. Sepals 3–$3\frac{1}{2}$ lin. long, lanceolate, obtuse. Petals 4–5 lin. long and about as broad, obovate-suborbicular. Stamens 3; filaments $\frac{1}{2}$ lin. long; anthers $\frac{1}{2}$ lin. long, cup-shaped, opening by an apical pore, in the young state covered by a callous dome-shaped operculum. Style simple; stigma entire, truncate.

Lower Guinea. Angola; Benguela; in the River Quiriri, near Sakkemecho, 3900 ft., *Baum*, 811.

I have not seen a specimen of this; it is stated to be allied to *M. longipes*, Mart., but easily distinguished by its shorter peduncles.

1. **Medemia Argun,** *P. G. von Wiirttemberg.* Add; *Areca? Passalacquæ*, Kunth. in Ann. Sc. Nat. 1 sér. viii. 420; Hemsley in Nature, xxviii. (1883) 111.

5*a*. **Aponogeton hereroensis,** *Schinz in Bull. Herb. Boiss. 2, sér.* i. 764. A small plant arising from a thickened base. Leaves petiolate, about 3 in. long, either narrowly linear, 1 lin. or more broad and gradually tapering at the base, or oblong-elliptic, 5 lin. broad and suddenly contracted at the base, flaccid, acute. Spikes 9 lin. long, dense-flowered. Male flowers not seen. Female flowers: Petals broadly elliptic, $1\frac{1}{2}$ lin. long, 1 lin. broad, white, delicate. Carpels 6; styles about 1 lin. long; stigmas brown.

Lower Guinea. German South-west Africa: Hereroland; pool east of Windhoek, *Dinter*, 589, plain north of Waterberg, *Dinter*.

25*a*. **Kyllinga Filicula,** *C. B. Clarke.* Glabrous. Roots fibrous. Stem 1 ft. long, thread-like, not thickened at the base. Leaves thread-like, one as long as the stem. Head of 1 globose white spike, $\frac{1}{6}$ in. in diam., of about 12 spikelets; lower bract as if continuing the stem, 3 in. long, thread-like; upper bract $\frac{2}{3}$ in. long, pendent, thread-like. Spikelets each perfecting one nut. Nut-bearing glume ovate, hardly acute, strongly nerved, not scabrous on the wingless keel. Nut flat, round, ellipsoid.

Lower Guinea. Lower Congo: Kisantu; on the Inkissi River, *Gillet*, 439!

12*a*. **Pycreus chorisanthus,** *C. B. Clarke.* Annual. Stems 4–8 in. long, very slender. Leaves long, very slender. Umbel of spikes simple, rays 1–4, up to $1\frac{3}{4}$ in. long; bracts 3–4, very slender, lowest 3–8 in. long. Spikelets 3–6 in a spike, $\frac{1}{4}$ by $\frac{1}{12}$ in., 6-flowered, very flat, green to yellowish. Glumes standing far apart, keeled, mucronate. Style (including its two branches) much shorter than the nut. Nut $\frac{1}{2}$ the length of the glume, unequal-sided, oblong-obovoid, flattened, dark brown; outermost cells subquadrate.

Lower Guinea. German South-west Africa: Hereroland, *Dinter!*

The examples seen were raised in the Zürich Botanic Garden. The species is allied to *P. pumilus*, Nees (i.e. *Cyperus hyalinus*, Vahl), but the spikelets and glumes are much smaller.

4*a*. **Mariscus oblongi-nux,** *C. B. Clarke.* Glabrous. Basal bulbs large, ovoid, in clusters. Stems 15 in. long, rather stout. Leaves 4–8 by $\frac{1}{8}$ in. Inflorescence of one ovoid dense pale head, $\frac{1}{2}$–$\frac{3}{4}$ in. in diam.; bracts 3–4, lowest 1–2 in. long. Spikelets very numerous, perfecting 1 or 2 nuts. Flower-glume straw-coloured, $\frac{1}{6}$ in. long, thin, ovate-oblong. Nut $\frac{1}{10}$ in. long, oblong; style short, branches 3, very delicate.

Mozamb. Dist. British Central Africa: Nyasaland; Namasi, *Cameron*, 90!

19*a*. **Fimbristylis splendida,** *C. B. Clarke.* Stem exceeding 4 ft. in length. Leaves exceeding 2 ft. in length. Umbel dense, with erect branches and numerous spikelets. Spikelets $\frac{1}{3}$ in. long, bright brown; otherwise as *F. complanata*, Link.

Lower Guinea. Lower Congo: Kisantu, on the Inkissi River, *Gillet*, 818!

This is closely allied to *F. complanata*, but considerably larger than any example of that species. In *F. splendida*, the umbel is repeatedly closely compound, with the branches and branchlets erect.

2. **Premna longipes,** *Baker in Dyer, Fl. Trop. Afr.* v. 288, is a synonym of **Hoslundia opposita,** *Vahl*; *Baker*, l.c. 377.

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ERRATA.

Page 6, headline, for *Eichornia* read *Monochoria*
,, 50, line 7 from the bottom, *for* Höhnel. *read* Höhnel,
,, 64, headline, for *Aneilem* read *Aneilema*
,, 94, line 4, *for* Infloresence *read* Inflorescence
,, 96, ,, 8 from the bottom, *for* Fl. *read* Pl.
,, 125, headline, for CXLIII. read CXLVII.
,, 158, line 16, for *Aracæ* read *Araceæ*
,, 161, lines 1, 6 and 8, for *Pseudhydrosme* read *Pseudohydrosme*
,, ,, line 3, for *L.* read *P.*
,, ,, ,, 10, for **PSEUDHYDROSME** read **PSEUDOHYDROSME**
,, 170, ,, 5 from the bottom, for *Oligogynum* read *Oligogynium*
,, 197, ,, 8 ,, ,, ,, *for* Hook *read* Hook.
,, 239, ,, 1, for *Wickstr.* read *Wikstr.*
,, 245, ,, 4 from the bottom, *for* Hochst, *read* Hochst.,
,, 263, ,, 15, *for* trigonous; glabrous *read* trigonous, glabrous

Page 272, line 7, for Dinter read *Dinter*
,, 275, ,, 8 from the bottom, for *Heus* read *Hens*
,, 282, ,, 16, for *naumanianna* read *naumanniana*
,, ,, bottom line, *for* hort *read* short
,, 295, line 2, for *A.* read *C.*
,, 300, ,, 1, for *Scott-Elliott* read *Scott-Elliot*
,, 323, ,, 7 from the bottom, for *Kyllingia* read *Kyllinga*
,, 329, ,, 2 ,, ,, ,, *for* Ghttas *read* Ghattas
,, 333, ,, 23, for *Schweinfurlh* read *Schweinfurth*
,, 335, ,, 4 from the bottom, for *Schinz.* read *Schinz,*
,, 341, ,, 32, for *Conspect* read *Conspect.*
,, 348, ,, 4 from the bottom, *for* Append *read* Append.
,, 356, ,, 24, for *Cardosa* read *Cardoso*
,, 359, ,, 9, *for* Fl. *read* Pfl.
,, 363, ,, 27, for *zmaculatus* read *maculatus*
,, 367, ,, 10, for *C. neuerensis*— read —*C. neuerensis,*
,, 387, ,, 14, *for* Schweinf *read* Schweinf.
,, 410, ,, 31, *for* Antill *read* Antill.
,, 416, ,, 38, for Isert read *Isert*
,, 429, ,, 8 from the bottom, *for* 33 *read* 38
,, 433, ,, 1, *for* 21 *read* 210
,, 471, ,, 7, for Luja read *Luja*
,, 473, ,, 16, *for* Welw *read* Welw.
,, 474, ,, 25, before *A. brasiliensis* insert 9
,, 480, ,, 9, *for* Rendicosti *read* Rendiconti
,, 494, ,, 4, *for* 15 *read* 16
,, 510, ,, 25, *for* nute *read* minute
,, 511, ,, 14 from the bottom, *for* botantist *read* botanist

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